

American Forestry



SEPTEMBER

1910

PROTECTION OF FORESTS FROM FIRE

By HENRY S. GRAVES

A FORESTER WHOSE FIELD IS THE CITY

By C. D. MELL

THE REFORESTATION OF DENMARK

By WILLIAM HOVGAARD

THE STORY OF MANTI

By WILL C. BARNES

FORESTRY WORKERS IN NEW**HAMPSHIRE**

By EDWIN A. START

AGRICULTURAL LANDS IN NATIONAL**FORESTS**

By HENRY S. GRAVES

EDITORIALS

and

DEPARTMENTS

1907-1910—Two Letters from John D. Archbold Regarding Tree Surgery as Practiced on His Estates by Davey Experts

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New York.

July 15, 1907

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John D. Archbold

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May 24, 1910.

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John D. Archbold

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Indexes for Vol. XV (1909) are ready and may be had on application

The American Forestry Association

is a national organization composed of public-spirited citizens who are interested in the prevention of the wholesale destruction of our forests, in forest extension and utilization, and in the fullest cooperation of national, state, municipal, and private agencies for these purposes. The Association has no business or governmental ties or alliances. Its work is to educate the people to know and understand the value and necessity of forests in the Nation's life and the way to maintain them to the best advantage through scientific forestry; and to bring about such wise legislation as will best secure the desired results. It is the people's forestry advocate and the representative of forestry before the people.

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EDUCATIONAL DEPARTMENT.—Series of educational and general bulletins and leaflets will be issued at intervals. These will be sent to all members and will be provided for distribution at a nominal cost. The first numbers of the general series are a brief summary of the history and need of the project for National Forests in the southern Appalachian and White mountains; the record of the vote on the Weeks bill, looking to that end, in the Sixtieth Congress; and a part of the argument for the Appalachian forests by the President of the Association, Hon. Curtis Guild, Jr., in his annual address for 1910.

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CORRESPONDENCE BUREAU.—Through this bureau the Association will furnish information on forestry when possible and provide advocates of the cause with material.

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The office is at 1410 H Street N. W., Washington, D. C.

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A LOOKOUT STATION, CABINET NATIONAL FOREST

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THE PROTECTION OF FORESTS FROM FIRE

By HENRY S. GRAVES
Forester, U. S. Department of Agriculture

(Owing to its great importance, Bulletin 82 of the Forest Service, which has just been published, will be reprinted entire in American Forestry, in six instalments, of which this is the first.)

INTRODUCTION

THE first measure necessary for the successful practice of forestry is protection from forest fires. As long as there is any considerable risk from fire, forest owners have little incentive to make provision for natural reproduction, to plant trees, to make improvement cuttings, or to do other work looking to continued forest production.

In many localities great progress has lately been made in forest protection. Organized fire protection has been established in the national forests and in most of the state forest reservations. A number of states have begun to develop systematic fire protection on private lands through the organization of state firewardens. In some instances private owners have formed cooperative associations for fire protection and employ a regular force of rangers for patrol during the fire season. The most conspicuous and successful associations are those formed by certain lumber companies in Idaho and Washington.

Throughout the country there are here and there instances of serious effort toward thorough fire protection by individual private owners. In spite of all that has been done, however, the fact remains that most of the forests of the country, particularly those privately owned, are inadequately protected from fire. It is probable that in fully seventy-five per cent of the private forests there is no attempt whatever at systematic protection.

CHARACTER OF FOREST FIRES

It is customary to distinguish three classes of forest fires, as follows:

(1) *Surface fires*, which burn the surface layer of dry leaves and other litter, dry grass, brush, and small trees.

(2) *Ground fires*, which occur where the mineral soil is covered with a deep accumulation of vegetable mold, and which, on account of the peaty character of the material, burn much more slowly than surface fires.

(3) *Crown fires*, which burn through the crowns of the trees.

SURFACE FIRES

Nearly all forest fires start as surface fires. The dry litter on the surface of the ground is ignited by a spark, perhaps from a locomotive or a campfire. At first the fire burns in a small circle, gradually eating out in all directions. If there is a wind, the fire burns with greatest intensity on the leeward side, and quickly assumes an oval form. If the wind is very strong, the fire may die out entirely on the windward side, but it burns intensely on the other side, soon developing a distinct front or head, with side wings running diagonally with the wind. At first the front of the fire is very narrow, but it gradually widens and takes the form of a broad, irregular line. The front may reach indefinite proportions, from a few hundred feet to a number of miles in width. Irregularities of topography and differences in the amount of inflammable material cause the fire to burn more rapidly in some spots than in others, so that the entire front becomes scalloped and irregular.

Ordinarily a surface fire simply burns along the ground and does not get into the tops of the trees. Sometimes, however, the flames reach up into the crowns and scorch them, or even ignite them here and there; but such a fire still has the character of a surface fire, unless it actually burns through the crowns.

The manner of burning, the form of the fire area, the rapidity of burning, and the intensity of the fire depend upon the following conditions:

- (1) The character and quantity of inflammable material.
- (2) The topography.
- (3) The character of the soil.
- (4) The condition of the atmosphere.

Inflammable Material

The severity of a surface fire depends largely on the quantity of dry material in the forest. If there is an accumulation of leaves representing the fall of a number of years the fire is much more severe than if the litter is the result of the fall of only a

year or two. The quantity of accumulated litter is greatest with species having large leaves and large crowns. Maple and red oak, for example, make a heavier litter than ash or birch; white pine makes a heavier litter than pitch pine. The severity of a fire depends further on the character of the leaves. A layer of resinous softwood needles burns more rapidly and with a hotter fire than does a layer of hardwood leaves.

The amount of dry wood on the ground influences largely the severity of a fire. In some types of forest there are a great number of fallen dead trees, which litter the ground, and thus increase the fire danger. This is well illustrated in the lodgepole pine forests of the Rocky Mountains. In localities subject to windfall there is likely to be a large amount of fallen timber, while fires, disease, and insects leave standing dead trees and snags, which are easily ignited. After lumbering in the old-fashioned way, the ground is covered with a mass of tops and rejected logs, which soon become dry and highly inflammable.

Again, the condition of the litter and debris governs largely the character and severity of the fire. The most severe fires occur where the material is thoroughly dried to the mineral soil. When the material is only partially dry the fire is slow and the litter is not completely burned.

Since the ground litter is, as a rule, unevenly distributed, a surface fire burns very irregularly. Still another cause of the irregularity of surface fires is the varying soil moisture.

Topography

A fire runs uphill with great rapidity, because the heated air currents draw the flames upward. If the litter is evenly distributed, the velocity with which a fire will run up a slope is in direct proportion to the steepness of the slope. After passing the crest, a fire travels slowly in its descent on the other side.

Mechanical obstructions, such as abrupt walls, narrow ridges, outcrop-

ping ledges, and so on, tend to check a fire and to prevent its gathering volume. On extensive level ground, fires burn more uniformly, gather a greater volume, generally do more damage, and extend over a larger area than in rugged topography.

Character of the Soil

Any influence which tends to dryness increases the intensity of a fire. Thus on sand and limestone soils, which warm up and dry out readily, fires are likely to be very severe. Southern and western slopes are apt to be more severely burned than others, because they are the warm and dry exposures.

Condition of the Atmosphere

The character of a fire is influenced, further, by the condition of the atmosphere. Roughly, the greater the velocity of the wind, the more rapid is the progress of the fire. A fire burns more severely when the wind is constant than when it is gusty. It is the steady high wind which makes the most intense fire.

A fire burns most fiercely when the atmosphere is dry. Fires are, therefore, most severe during the hot part of the day and when fanned by a dry wind. A moist atmosphere retards a forest fire. The well-known fact that the night is the best time to fight a fire is thus explained; for at night there is usually little or no wind, while the air is comparatively heavy and damp.

Rapidity of Surface Fires

No reliable estimate of the rapidity of surface fires can be made, because it varies so greatly under different conditions. In the hardwood regions of the east a surface fire seldom travels more than five miles a day, but in the coniferous forests of the west instances are known where this rate of speed has been more than doubled.

Grass Fires

In nearly all open forests there is a certain quantity of grass which, when dried, carries fire very rapidly. In many forests the presence of grass constitutes one of the important problems connected with surface fires. This is particularly true in the southern pine forests.

A grass fire is more influenced by the density of the grass than by its height. Where the grass is in separated patches, with no leaves or other inflammable material between, it is difficult for a fire to spread. Uniformly dense grass burns with the greatest intensity. High grass burns with greater intensity than low grass, but the fire does not usually run so rapidly. Grass a foot high, if dense, may produce such a hot fire as to start a crown fire. In short grass, with an ordinary wind, a fire will run from three to four miles an hour; with a high wind, twice as fast. The chief factors affecting the burning of grass are its dryness and the force of the wind. Other factors have their influence, however, just as they do in the burning of litter.

Brush Fires

Bushes and small trees frequently retain many dried leaves late into the fall, and in some cases even into the following spring. This is particularly true of some of the oaks. A fire will sometimes run through such brush and do an immense amount of damage. Such a fire is called a brush fire. It is carried along in part by the burning of the litter, but, wherever the opportunity offers, it runs up through the dried leaves remaining on the brush. In the eastern United States a brush fire is most likely to run during the late fall. Under ordinary circumstances, it has rather the character of a surface fire than that of a crown fire.

Fires running through young stands of conifers consume the foliage and readily kill the trees. In a very young stand, in which the trees stand isolated and the crowns have not yet grown to-

PLATE II



Fig. 1.—Fungus Attacking Tree Through Fire Scar

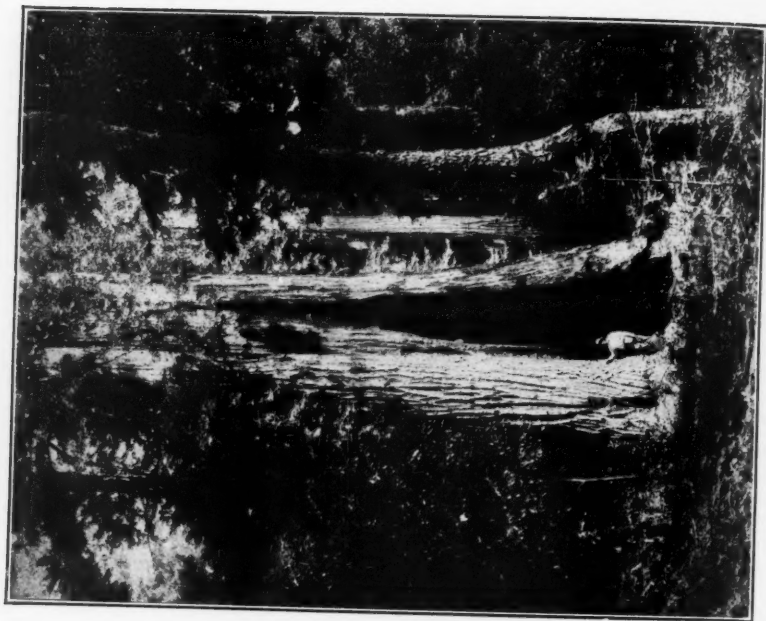


Fig. 2.—Hollow Tree, the Result of Fires

gether, the fire has the nature of a surface fire, intensified by the burning crowns. If the crowns meet, and there is a more or less complete canopy, a true crown fire is developed.

A special class of brush fires are those in the chaparral of the southwest. The brush is dense and there are many species with inflammable foliage. In many places a thick layer of litter and humus is formed on the ground, just as in a dense forest. Fires in this type of scrub forest are very fierce and destructive, and are analogous to fires in dense stands of young conifers.

GROUND FIRES

This term is applied to the slow fires that burn in the deep accumulations of vegetable matter common in many of our damp northern forests. Here the fallen leaves, needles, and other off-castings of the trees decompose very slowly, and a deep layer of partially decayed organic matter accumulates, often to a depth of from two to three feet. This material absorbs moisture with avidity and retains it tenaciously. Consequently, in most seasons it is not readily ignited. In some seasons, however, it becomes thoroughly dry and will burn. A fire in this peaty substance burns slowly, but with very intense heat, and is exceedingly difficult to extinguish. Ground fires in the Adirondacks have been known to burn all winter, creeping along under a deep layer of snow.

Ordinarily a ground fire will not cover more than a few acres in a day. Frequently, however, there is upon the surface a large amount of dry debris or small coniferous trees, so that there accompanies the ground fire a surface fire or a brush fire, or both, and occasionally a crown fire.

CROWN FIRES

Crown fires are those which burn through the crowns of the trees. (See Plate II.) They almost invariably start from surface fires. Occasionally, however, they are started when lightning

strikes and ignites a dry stub or resinous tree surrounded by a dense stand of conifers. If the crowns are of such a character that they will burn they may be easily ignited by the flames which rise from a surface fire. Sometimes a crown fire is started by the flames from a burning clump of young growth, and where the trees have exuded resin or there is loose inflammable bark, a crown fire may be started by the flame's running up the trunk.

Crown fires occur when the woods are very dry and when there is a high wind. Without a strong wind a crown fire is seldom started, and even if the crown of an individual tree is ignited, a fire does not usually spread and run through the crowns on a still day. Before a high-wind, a crown fire spreads with great velocity, taking at once a V-shaped form with a distinct front or head. This head may be only from fifty to 100 feet wide, but in the case of the largest fires its width may be very great. In the case of the larger fires the front is generally carried forward by a series of heads. The head of the fire burns very rapidly through the crowns, and there follows closely a surface fire burning with the same rapidity. There are well developed wings, where the fire runs through the crowns on each side of the head. These, in turn, are accompanied by surface fires, while spreading out on the skirts are wider surface fires, eating out diagonally with the wind and covering a broader area than the crown fire.

The strong draft of heated air arising from the fire carries up with it an immense quantity of burning cinders and pieces of bark. The wind, in turn, carries this material far in advance of the main fire head, and thus innumerable new surface fires are started. This gives rise to the popular idea of a spontaneous starting of fires in advance of a crown fire.

An ordinary crown fire does not run more than two or three miles an hour, although undoubtedly the great conflagrations of the north woods, such as the famous Hinckley fire in Minnesota in 1894, are swept along at a much

greater rate, particularly if the starting of new fires by burning cinders is taken into consideration. Even in extreme cases, however, it is questionable whether crown fires burn at a rate of more than from six to ten miles an hour.

The behavior of a crown fire depends on the character of the crowns. Crown fires are mainly confined to coniferous forests, for the leaves of hardwoods are not easily ignited.

They may, however, run through forests of mixed hardwoods and conifers, and in such cases the heat generated is so great that the hardwood leaves are scorched or killed. The velocity of the fire depends, further, on the density of the stand, the thickness of the crowns, and the force and steadiness of the wind. Other influences affect the severity of crown fires in much the same way as they affect that of surface fires.

DAMAGE BY FIRES

The damage done by forest fires may be discussed under the following heads:

- (1) Death of standing trees.
- (2) Injury to trees that are killed.
- (3) Injury to the soil.
- (4) Reduction of the rate of growth of the stand.
- (5) Effect of reproduction.

Death of Trees

Crown fires kill outright most of the trees in their paths. In a severe crown fire the foliage of coniferous trees is completely consumed. Hardwood trees in mixture are generally so badly scorched that the buds, leaves, and living tissues in other finer parts of the tree are killed, if not consumed, by the heat. Sometimes, however, where the fire burns somewhat irregularly—as, for example, where there are a good many hardwoods in mixture or the fire is broken by irregularities in topography—single trees or groups of trees often escape injury.

Ground fires, also, usually kill all trees in their way, for although they burn very slowly, they generate a great volume of heat and kill the living tis-

sues of the roots. Sometimes the injury is not apparent above ground, at all, but the trees die and after a time are blown over, because the roots have been killed and weakened.

Surface fires kill seedlings and young trees with tender bark, but in a great many cases do not kill outright the larger trees. Nevertheless, a very severe surface fire may kill everything in its path, and, not uncommonly, hardwood forests are entirely destroyed by fires which do not at any time assume the character and proportions of crown fires.

Some species have much greater power of resisting surface fire than have others. This is usually due to the character and thickness of the bark. Trees with delicate, thin bark are killed much more readily than those with thick, corky bark. Young trees are killed more readily than old ones, because the bark is thin and there has not been developed the layer of cork, which increases in amount with age. Accordingly, some trees which are very resistant to fire when mature are exceedingly sensitive when young. Good examples are the eastern and western white pines, the red pine, the western larch, and Douglas fir. The cork in the bark acts as a nonconductor and protects the living tissues from overheating.

Some species exude from the bark a great deal of resin, which catches fire and increases the intensity of the heat. A good example is lodgepole pine, which often exudes resin over a considerable portion of the trunk and increases the damage by fire. Other trees have soft, flaky bark, which catches fire readily. Like the resinous trees, these are killed at the point burned by the heat generated in this way. Shallow-rooted trees may be killed by surface fires when the heat of the burning humus is great enough to injure the insufficiently covered roots.

The living parts of a tree are more sensitive to intense heat at some periods of the year than at others. The most sensitive period is during the early part of the growing season, when active cell division is taking place and new cells

PLATE III



Fig. 1.—Lodgepole Pine Damaged by Fire



Fig. 2.—A Burning Turpentine Box—Longleaf Pine

are being formed, which are tender and naturally sensitive to abnormal conditions. This is very well shown by the damage of late spring fires. Thus, a surface fire in May or June may entirely kill hardwood trees which in the early fall would successfully resist a fire of equal severity. . .

Living tissue is killed when it is heated to fifty-four degrees Centigrade (129.2 degrees Fahrenheit).^{*} Very often the forester wishes to determine after a fire the extent of the injury. If the inner bark is brown or black, in contrast to the normal green color, this is an indication that the cambium is dead.

Injury to Trees

Many surface fires do not kill trees outright, but seriously injure them by killing a portion of the roots or trunks. It is very common to find, after a fire, that nearly all the trees in the forest have been killed on one side. (Pl. III, fig. 1.) This is usually the leeward side, because here the flames have an opportunity to burn in immediate contact with the tree long enough to injure it. If a fire is burning up a slope, even when there is no wind, the upper side of a tree is usually more damaged than the lower side, both because of the accumulation of leaves and other litter above the tree and because fires are carried upward by the currents of hot air, just as a fire on level ground is swept along by the wind.

In the case of a well-established tree, the killing of one side may not result in its death for a long period; and if the wound is not large it may heal over. Very commonly, however, the killing of one side of the tree induces the attack of some fungous disease, which ultimately results in the tree's death. (Pl. II, fig. 1.) Trees injured and weakened by fire are subject to the attack of insects. In many cases the death of trees after a burn is the result of insects' work and not of the killing of the tissues by the fire. Damage by fire often follows damage by insects. Thus, in

certain conifers insects injure the trunks, causing a local accumulation of pitch. A surface fire later burns the tree at this point and kills one side. The defect called "cat-face" is often caused in this way. Insect attacks, moreover, by increasing the number of dead trees in the forest, increase the fire danger.

In the case of large trees, which are very resistant to fire, a first fire may kill the tissues on one side, and subsequent fires may then burn into the dead wood until the trunk is nearly hollow. This result is very commonly seen in large white pines, that have a large proportion of the butt gouged out by repeated fires and are still alive. Many of the larger trees on the Pacific coast, like red fir, yellow pine, sugar pine, and big-tree, stand for many years after injury of this character.

The damage to a tree by killing a part of the trunk or a part of the roots depends on its resisting power and a variety of other circumstances. In some cases the tree is so weakened by the burning that it is afterward broken off at the butt. This is very common in longleaf pine forests, where old turpentine "boxes" burn out and weaken the tree. (Pl. III, fig. 2.)

The injury to the tree usually results in a reduced rate of growth. It is obvious that if a portion of the tree is killed the whole tree cannot perform its functions so effectively as before. The killing of a part of the crown, stem, or root system necessarily reduces the amount of nourishment which the tree can take in and furnish the growing parts.

It is not only in shortening life and in reducing growth that fires injure trees; the quality of the product is also affected. Even where there is no infection by insects or fungous disease, a fire that has killed one side of a tree usually leaves its scar. In time the wound may entirely heal over, but there is nearly always a point of weakness which may ultimately cause a seam or wind shake and unfit the butt log for lumber. If rot sets in, it may spread throughout the trunk and make the tree worthless, even if it does not kill it.

^{*}Der Waldbau, by Heinrich Mayr, p. 12.

Injury to the Soil

A surface fire burns the dry leaves, and usually the humus which lies on the surface of the ground. If the trees are all killed by the fire, the crown cover, as well as the layer of litter and humus, is destroyed, and injury to the soil follows this exposure to the wind and sun. If the canopy is not seriously interrupted by the fire and only the surface litter and humus are burned, the extent of the soil injury from one burning is not serious. A very light surface fire that merely burns off the dry litter formed by one or two years' fall of leaves has little influence on the soil; and probably no single fire, even if it burned the entire humus and layer of litter, would so injure the soil as seriously to affect the growth of well-established trees. Normally in every forest a certain amount of humus is mixed with the mineral soil. This is of value, both physically and chemically. If a forest is burned over repeatedly, however, the humus in mixture gradually disappears, and since the leaves which fall are destroyed, and no new humus is formed, the soil is injured. While the soil loses its supply of nitrogen and the physical benefits of humus, the mineral ashes are not lost except as they are subsequently leached away. Nevertheless, repeated fires are very injurious to the forest.

Besides the direct injury to the soil through changes in its chemical content and physical quality, fires do further damage through opening the way to soil erosion. A leaf litter reinforces the forest canopy in protecting the soil against the impact of falling rain, and the network of roots which fill the ground hold the soil in place. The greater the humus content of the soil, the more absorptive the soil is. Fires leave the soil in condition to be easily borne away by running water, and increase the amount of water which runs over the surface instead of sinking in. If the slopes are steep and the soil easily borne away, erosion is sure to follow fires. In mountain country, if

the rainfall is heavy, thin soils may be so badly washed as to be no longer capable of supporting forest growth.

Reduction of Density

Most fires kill a certain number of trees, or injure them so that they either die or deteriorate in value before the forest can be cut. This is particularly the case with immature forests. The result is a reduction in the number of trees which will come to maturity, and hence reduction of the total increment and the final yield.

If a stand is mature and a part of the trees are injured or killed, it is sometimes possible to prevent loss by cutting directly after the fire. Often, however, it is not practicable to make a cutting in a given part of a forest just when desired.

When some of the trees in an immature stand are killed or injured there is always a loss. If the stand is cut, there is a loss through cutting trees which are in full productive growth. If the stand is allowed to grow, the final yield is reduced nearly in proportion to the reduction in the number of trees killed in the dominant or leading class.

An owner is often confronted with the problem of dealing with an immature stand in which a part of the trees—say thirty to sixty per cent—are killed or injured by fire. If the remaining trees are sound and thrifty, the best plan is usually to cut out the dead and damaged individuals, utilizing such as are marketable, and permit the remainder to mature, provided enough can be realized to cover substantially the cost of the work.

Effect on Reproduction

Reproduction in the forests of this country has been more influenced by fire than by any other one factor. The present composition, form, density, and yield of a great many stands are due to the influence of fires on reproduction.

Repeated fires prevent reproduction by destroying the seed and killing the seedlings. This is well illustrated in

certain areas of the south, where long-leaf pine is not reproducing itself—not because there is a lack of seed or because the conditions for germination are unfavorable, but because the annual fires kill the young trees.

Fires may influence reproduction through their effect on the soil and the soil cover. Frequently, after fires the ground is occupied by heavy brush or by grass, which impedes or in some cases prevents the reproduction of valuable trees. Many of the grass parks in the western mountains are the result of fire. A grass vegetation has replaced the forest. The running wild of burned areas to a heavy growth of brush is a common occurrence after fires in many of our eastern forests, as, for example, in Pennsylvania.

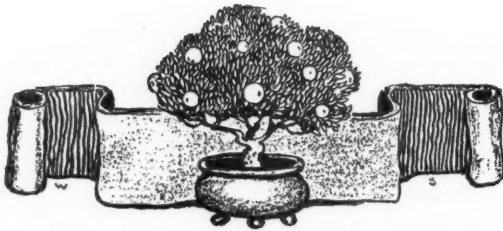
Forest fires modify the composition of stands. The opening up of a forest may so change the conditions of germination that some species cannot develop even when seed is abundantly supplied. This is in some cases due to the drying of the soil. A species which requires protection against drought in early youth might be excluded from

openings made by fire. In the same way the reproduction of a species sensitive to frost in early youth is often confined to areas protected by old trees.

Where the fire makes a large clearing, the succeeding forest usually differs in composition from the burned stand, except where there are only one or two species native to the region. The first species to spring up on the burn are those whose seed is readily and abundantly distributed to a distance from the seed trees. Thus, in the north woods of the east, birch and aspen are among the first species, because their seed is very light and is blown by the winds to great distances. Bird cherry comes up in abundance, because its seed is spread widely by the birds, and probably much of it is already in the ground before the fire. The trees with heavier seed creep in gradually after a few years.

Fires may kill certain non-resistant species, and thus stop their supply of seed. The tendency of repeated fires is to reduce the number of species in a stand.

(To be continued)



A FORESTER WHOSE FIELD IS THE CITY

By C. D. MELL

THE time is coming when the work of caring for trees in city parks and streets will call for men with a professional forester's training. Indeed, this time is already at hand. More big cities than one have foresters employed, and the work these foresters have to do can be effectively done only by men who have gone through a technical course of study such as prepares a man to handle trees in the mass for profit, instead of individually for ornament and recreation.

One of these cities is New York, where city forestry has been developed more extensively than anywhere else in the country. In the boroughs of Brooklyn and Queens there are 150,000 street trees, forty-one parks, and forty-five miles of parkways to look after, and a graduate of the Yale Forest School, Mr. J. J. Levison, formerly of the United States Forest Service, is in charge. Mr. Levison is also forester of the recently organized American Association for the Planting and Care of City Trees.

It would be a great mistake to suppose that the work of a city forester is simple, merely because he has to deal with single trees and not with whole forests. Assuredly, it is no simple matter to be responsible for the welfare of 150,000 separate and distinct trees, all of which are in plain sight all the time, and most of which some citizen takes an almost proprietary interest in. The tree that stands in front of the city man's gate is pretty nearly the only tree that he cares a rap about; but about that tree he cares at least several raps. He wants and expects it to be thrifty and sightly; he considers it distinctly

up to the man in charge to keep it so.

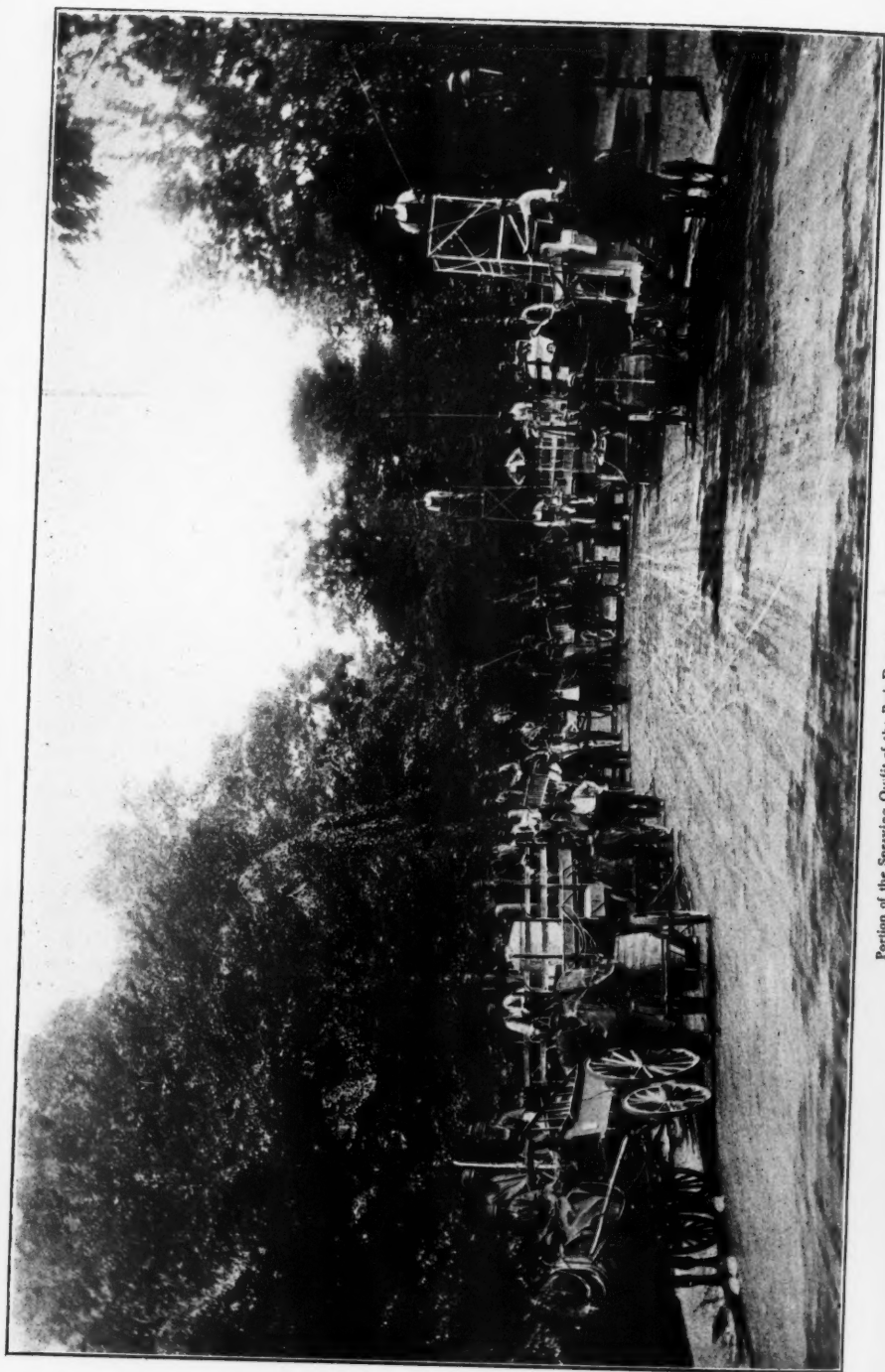
In the parks, again, a good many thousands of persons have a chance all the time to find fault with neglect of trees, when there is neglect; and if nobody has ground for complaint on this score, the reason is, whether appreciated or not, that the city forester is energetically holding down his job.

So if he is in earnest, the city forester's job will tax his lore and skill to the utmost. It is a new line of work, with big difficulties and a promising future. Mr. Levison was asked to outline for AMERICAN FORESTRY the work that falls to his share as city forester of Brooklyn and Queens. It was found that this outline skirted a wide and varied field.

THE CARE OF TREES

To begin with planting, the city forester, in addition to knowing the general principles of tree planting, must be familiar with the best methods for handling a much larger number of species than are ordinarily used in commercial planting, and understand how to adapt trees to a variety of local conditions that are not met with elsewhere. On account of the necessarily high cost of the work, as nearly as possible every planted tree must be made to grow. A nursery of 80,000 seedling trees is maintained for Brooklyn and Queens, and extensive experimental work is done toward solving special problems. One important branch of expert work is the transplanting of extra large trees.

In ordinary forestry, little pruning is done, even in Europe, on account of the cost; but in park and street work it is



Portion of the Spraying Outfit of the Park Department, Brooklyn, New York

essential. Scientific pruning calls for an intimate knowledge of the structure and life of a tree. The city forester not only supervises the city employees who prune trees, but regulates all pruning done by private persons.

Fighting the insects means knowing forest entomology and the use of insecticides, as well as practical experience with the best methods and apparatus. City trees have a vast number of insect enemies, and these cannot be exterminated merely by sprinkling the trees with chemical solutions. The city forester has to contend with epidemics of insects that cause wholesale destruction. The need and value of expert work has been shown by success with such epidemics in Brooklyn. Among other things, it was brought to light that a certain lead arsenate, extensively used in many eastern cities, was inef-

fective. A better one was found for exterminating leaf-eating insects.

Tree diseases have to be mastered, and this involves a knowledge of fungi and of their life-history. Again, cavities and wounds require special treatments, by means of which a forester may save considerable expense. Attacks of the hickory-bark beetle, the sycamore blight, the chestnut disease may become epidemic. Detecting them and suppressing them as promptly as possible requires constant close attention and the application, sometimes, of heroic methods. A very important field for scientific experiment is offered in connection with this work.

REMOVING TREES

Besides planting and tending trees, the city forester has to remove them.



Removing Egg Masses of the Tussock Moth Caterpillar in Brooklyn, New York



Decayed Tree Overthrown by the Wind in the Borough of Queens, New York

There are improvement thinnings to be made in the wooded areas of the parks, and dangerous and diseased trees must be taken out. In many cases special care and skill are needed to prevent injury to shrubbery or property. There are still some 3,000 dead trees standing on the streets of Brooklyn. Dangerous trees are removed within twenty-four hours after notification. What an emergency may call for is shown by the fact that during the severe storm of June 18, 1910, 300 trees were uprooted and made dangerous to life and property, and the task of clearing them from the streets in forty-eight hours devolved upon the city forester.

Trees in the forest do not have to be fertilized, because by the accumulation of humus they themselves keep storing up nitrogen in the soil. The nitrogen supply in the soil of an old forest may compare favorably with that in artificially fertilized agricultural soils, as Prof. Henry, of the French Forest School at Nancy, has shown. But city trees must sooner or later be fertilized;

the soil around them becomes impoverished in course of time, and nourishment must be supplied artificially.

The protection of trees from physical injury includes all sorts of mechanical devices, such as bars to prevent splitting, guards around the trunks, drainage and irrigation pipes, guards against electric wires, and other safety measures.

Supervising the work done by six or eight hundred men in the various parts of the city is a task that calls for good organization. Other supervisory work embraces a system of permits and inspection for regulating the planting and care of trees by private persons; the establishment and enforcement of rules for house moving and street grading where trees are apt to be interfered with; preventing injury by telephone and other electric wire companies, by steam engines placed under trees, by advertising signs, by guy-ropes attached to trees, etc. Not only must the men be well organized for this work, with the proper man in the proper place, but

the work must be carefully checked up. The forester must, moreover, strive to train his men by practical illustrations, lectures, pamphlets and field instruction.

Over 25,000 requests for attention from individual citizens have been received in Mr. Levison's office in the last three years. These called for advice on all sorts of tree problems, and it was the task of the forester to train men to answer the less important questions and to look personally into the others. The information given ranges from identifying tree species, insects, and diseases, to advising on treatment, planting, and other operations. It is furnished for use on home grounds as well as for public trees. Frequently advice is given even to non-residents, by mail.

A map in the city forester's office shows the location and condition of every street tree. Other necessary records include tree maps of the parks, 2,000 photographs, statistics of conditions, a record of the treatment applied to every tree that has been brought to the attention of the department, reports, and similar details.

PROMOTING PUBLIC INTEREST

Lectures are given before organizations; before the people, under the

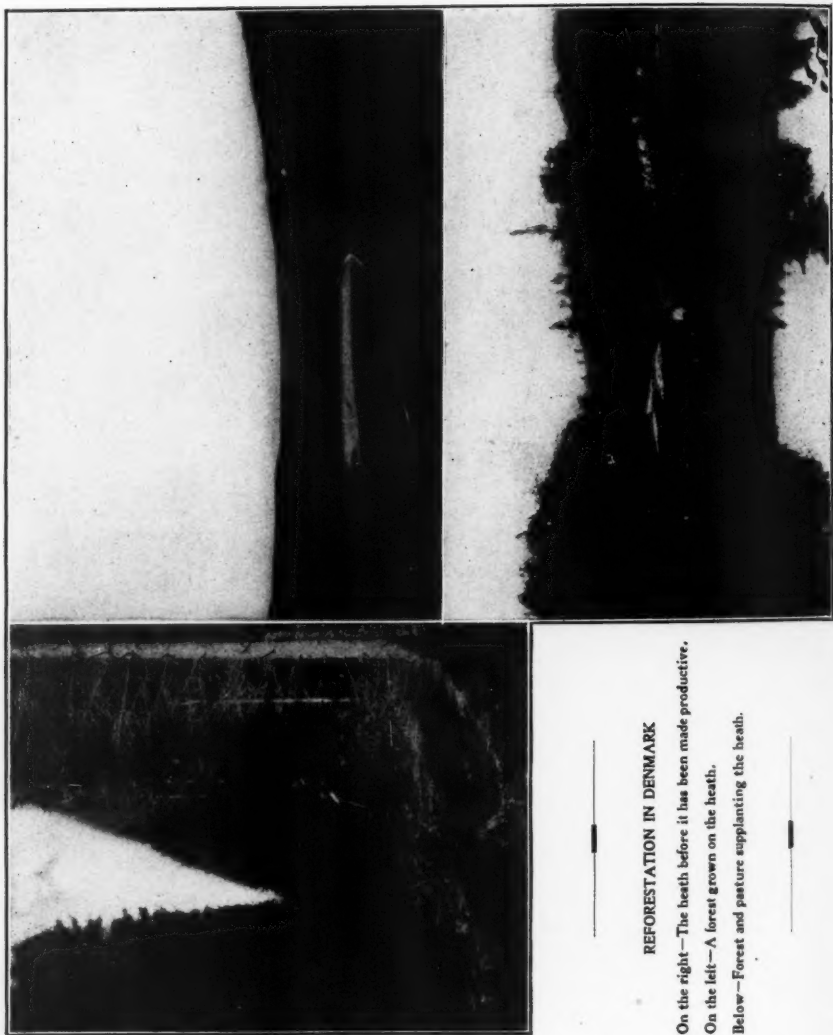
auspices of the board of education; before civic bodies in New York and other cities; before scientific bodies and courses for teachers, and at local scientific institutions. Over a hundred lectures of this character have been given in the last four years.

Articles are prepared for gardening, scientific, and popular magazines, for newspapers, museum journals, and school publications. More than forty such articles have been written, and 150 interviews have been given out.

Other educational work includes teaching both children and adults by means of labels placed on the trees in the parks; through addresses, messages, and celebrations on Arbor Day; by the publication of tree guides, and by the formation of tree clubs. Special tree labels were prepared and posted for the Hudson-Fulton celebration last summer.

The widespread educational effects of good work in caring for city trees will extend, necessarily, beyond the city limits and rouse an interest in economic forestry, the aim of which is strictly practical. For this reason the city forester's task is more than the creation of beauty. But it is through the beauty he achieves that the charm of the forest is made to lay a firmer hold on urban life. His work is, therefore, of far-reaching civic value.





REFORESTATION IN DENMARK

On the right—The heath before it has been made productive.

On the left—A forest grown on the heath.

Below—Forest and pasture supplanting the heath.

THE REFORESTATION OF DENMARK

By WILLIAM HOVGGAARD

THE peninsula of Jutland forms the continental part of Denmark. It was in old days covered with primeval forests, but these were gradually destroyed, especially in the central and western portions of the peninsula, where the soil is extremely poor; so that by about the year 1500 this part of the country had been largely transformed into a barren, black heath and sand dunes. The population had itself caused the destruction of the forests by a most reckless treatment of them, not comprehending that the presence of the forests was the main condition for the existence of human life in these parts of the country.

The climate, which had formerly been damp and mild, now became dry and harsh, and by the middle of last century a scant population was left settled on the long and narrow meadows along the water courses, which cut through the heath. These meadows were, however, gradually being transformed into heath, because the water courses cut themselves deeper into the bottom of the valleys, whereby the water level was lowered. Even on the east coast of the peninsula and on the Danish Islands, where the soil is richer, the forests had deteriorated to such an extent that in the eighteenth century there was a serious danger of their total disappearance. In the last half of that century, however, an awakening took place, and in 1805 an act for the preservation of forests was passed, whereby most of the forests then existing were saved. During the same period, that is, from about 1750, efforts were made to plant new forests on the heath, and during the following 100 years many attempts were made in this direction, largely with the support of the government; but the results were anything but encouraging.

It was generally found that, after a few years' growth, a stagnation would set in, and only in localities where the soil was richer would the trees grow up. Thus by the year 1866 but very small areas had been successfully planted, and while the east coast of Jutland was covered with woods and with fields of rye, wheat, oats, and barley, the western and central portion was covered with the dark heather as far as the eye could see. Here and there small groups of scrub oak would be found, remnants of former beautiful forests, crouched close to the ground under the influence of the strong westerly winds. In fact, one-fifth of the entire area of the kingdom was in a desert condition, and a still larger area was but very imperfectly utilized.

The many failures in planting and cultivating the heath had given to most people the conviction that it was hopeless to spend more energy and money on this problem. It was at this point that the cause was taken up by Col. E. Dalgas, an engineer officer of the Danish army.

Dalgas was a man of rare energy and ability and of great patriotic enthusiasm; it was plain to him that many dark points in the problem had to be cleared up before it could be technically solved, and many difficulties had to be overcome, among which perhaps the most formidable was the prevailing lack of understanding and faith in the cause. He saw that the work could not be started on the ground of immediate or direct financial return, and that it was necessary to appeal to the patriotism of his countrymen.

It was in one sense an auspicious moment for such a movement. In the unfortunate war of 1864 Denmark had lost the Schleswig-Holstein provinces,

and a general feeling of depression and discouragement prevailed. An idea, like the reforestation of the country by which large areas of land could be reclaimed, compensating in some measure for the lost provinces, would naturally appeal to the energetic and active elements of the population. No man was probably better fitted for this work than Dalgas. He soon succeeded in rousing interest in the cause, formed in 1866 the Danish Heath Society (Det Danske Hedeselskab), and found many warm supporters of his work, prominent among whom was the Danish consul-general in Hamborg, Pontoppidan, who enabled Dalgas to commence the work. Also, the government was induced to give a subsidy, which at first was small, but which in the following years was increased and was supplemented by increasing private subscriptions.

The first technical difficulty to be solved was that of finding a tree which would grow under the adverse conditions existing on the sand dunes and on the heath, and it was found that the mountain fir from Central Europe (*Pinus montana*) served the purpose better than any other tree. This tree would, in fact, thrive in spite of winds and drought, wet or cold, and would kill the heather by spreading close over the ground. Spruce, if planted alone, would generally reach a certain development, but then stagnation might set in and continue for many years; only in some spots would the trees grow up, where they appeared as hillocks or islands above the average growth of stunted and undeveloped trees.

The cause of this irregularity in the growth of spruce was sought in local conditions of the soil, but in many such cases the most scientific research has not revealed any difference in the physical or chemical composition of the soil, and it is now generally considered that the cause is biological.

The next great step in the development was the discovery of the remarkable fact that the mountain fir acted as a nurse to spruce trees planted in its vicinity. In the same localities where spruce, if planted alone, would remain

stagnant at an early age, it would, if planted close to a mountain fir, grow up vigorously; and on the basis of this discovery a new system of planting was introduced, by which the mountain fir and the spruce were mixed, one mountain fir for each one, two, or more spruce trees, according to the quality of the soil.

After some years of experience it was, however, found that the mountain fir, which had been an excellent nurse during the early years of the life of the spruce, would hamper their growth and cause them to stagnate when they were at the age of about ten years; while the mountain fir would grow up and overshadow the spruce. Now followed the next important step in the development, when it was discovered that even if the mountain fir was cut down at an early age, the vitality which it had given to the adjacent spruce trees would remain in effect, and these would continue to grow thereafter as well as if they had been planted in good soil.

This remarkable discovery was made by Colonel Dalgas's son, Christian Dalgas, who is a forester in the service of the Heath Society, and one of its leading men, and who has devoted his life to the continuation of the great work commenced by his father.

The influence of the mountain fir on the spruce was for a long time denied by many men of science. The phenomenon is not clearly understood, but various theories have been propounded, the most plausible of which seems to be that the roots of the mountain fir are inhabited by some microscopic parasite, which produces the nitrogen necessary for the growth of the trees, and that this organism is transferred to the roots of the surrounding spruce trees. Once this infection or transfer has taken place, the presence of the mountain fir is no longer necessary, and is, in fact, rather pernicious after the trees have reached a certain age.

Hence, by the latest method of planting, mountain fir and spruce alternate, so that one mountain fir is planted for each one or two spruce trees, and at an early age the fir, when it has done its



Planted spruce, with fir nurse trees removed



Planted spruce overtopped by fir nurse trees

work of starting the spruce, is cut down. The material obtained by cutting down the young fir is used as fence sticks, or it is utilized for burning charcoal and for making tar.

The spruces mostly used are white spruce (*Picea alba*) and red spruce (*Picea excelsa*). The former, which comes from North America, is particularly well suited for use in those parts of the plantations most exposed to the wind; in fact, it seems to stand the wind better than any other tree. White spruce is therefore used in conjunction with mountain fir to form the first sheltering windbrake, and behind such belts the red spruce is planted together with the mountain fir. The mountain fir mostly used is *Pinus montana uncinata*.

In the shelter of and surrounded by the forests, deciduous trees are planted and potatoes and other crops are raised. Live fences of fir and spruce are planted about 120 yards apart, running north and south, so as to provide shelter against the prevailing westerly winds. The soil is ploughed and treated with the proper fertilizers. In this way excellent and profitable results have been attained even in the poorest soil. Not only has the presence of the forests made the climatic conditions more favorable for agriculture, but the entire character of the country has changed. In the large forests deer are found in abundance, and wood pigeons, ducks, and many other wild birds have settled in them.

The activity of the Heath Society is also directed toward the planting of the sand dunes which cover large areas along the coasts of Jutland; great works of irrigation and drainage are undertaken and the numerous and extensive bogs have been brought under cultivation. A chalky clay called "mergel," which is found in spots all over the peninsula, is spread over the bog, the water is drained off, and the soil so prepared, with but little additional treatment, is well suited for pastures. In this way useless bogs have in a few years been transformed into the richest pastures.

Already more than 100 Danish square miles (2,500 English square miles), or about one-seventh of the entire area of the kingdom, has one way or the other been reclaimed since the Heath Society commenced its work, and in one more generation the heath will probably have entirely disappeared. A movement is in fact already on foot to preserve a certain part of the heath as a sample of what has been for centuries a characteristic feature of the country.

The growing interest for this cause is evidenced by the increasing means placed at the disposal of the society. The subvention of the government has now reached an amount of \$130,000 a year, and about an equal amount is derived from private donations. The peasants and farmers are intensely interested in this cause, and most farms, even in the poorest part of the country, are now surrounded by trees. Often larger groups of trees or small woods have been planted by the peasants or farmers and are regarded by them as their dearest treasure.

At a very moderate expense, land can be bought on the heath through the Heath Society, which at a very cheap rate undertakes planting the trees and their care, including the cutting down in due time of the mountain fir.

Large purchases of land have been made by private people in this way, chiefly on patriotic grounds, but in course of time this land and the forests which are planted on it are likely to acquire considerable value, for with the growth of the forests and the increased cultivation of the soil, the density of the population increases rapidly, and the means of transportation are steadily improved. A town like Herning, which lies in the middle of the heath district, and which in 1866 had but forty inhabitants, now has 5,000 inhabitants.

Some years ago a caterpillar (*Lo-phyrus pini*) appeared, and made great devastations in the plantations. Many people predicted the entire destruction of all the fir and spruce plantations; but the Heath Society did not lose courage, and proceeded to fight the pest. Soon a parasite was found, a wasp

which laid its eggs in the caterpillar, and after nine years the pest almost disappeared.

The experiences and discoveries of the Heath Society have been made fruitful also on the Danish Islands, and have been applied in neighboring countries; in fact, Germans, Swedes, Norwegians, and Finns have all studied and applied the methods developed by the society.

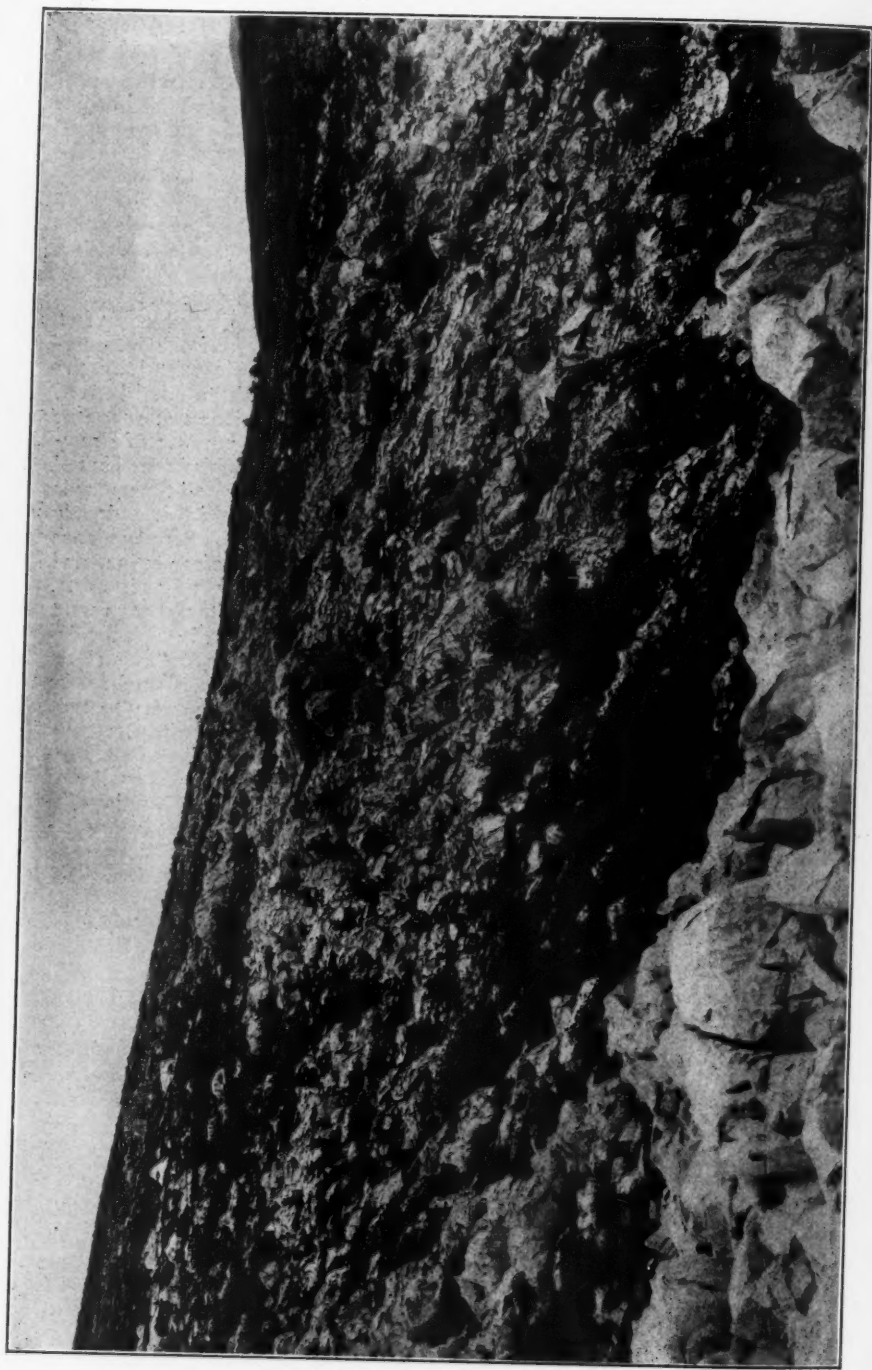
An interesting experiment has been made in connection with this work by employing in the cultivation of the heath prisoners from the state penitentiary for hard labor. About ten years ago, during the summer, a small number of prisoners were taken out to an isolated part of the heath in the middle of Jutland, at a place called Gedhus, and were there employed in all the various work connected with the preparation of the soil and the planting of the trees, under the supervision of two prison officials. Difficulties of various kinds had been anticipated, and many people were strongly opposed to the experiment, but it proved a complete success. Every year an increasing number of prisoners has been employed on the heath. The behavior of the prisoners has been perfect; they have enjoyed their work, the relative freedom and the life in the open air, and they

have had the great satisfaction of seeing the results of their work growing from year to year. Work on the heath has, in fact, always been considered by the prisoners a great privilege, and is granted only to those who stand highest in point of behavior. There are now some forty or fifty prisoners employed every summer on the heath, and a considerable amount of work has already been done this way.

The foregoing brief and imperfect sketch is a summary of the information and impressions obtained by the author during a visit to the Jutland heath and its plantations last summer; it is written for the purpose of drawing the attention of people in the United States to the work done and the methods applied in a country which has already gone through all the phases; abundance of primeval forests, deforestation, and the preservation and planting of forests.

The United States stands at present in the midst of the second stage, the deforestation, which is proceeding at an alarming rate; it may, therefore, be well for people of this country to turn their eyes to Denmark, where, at any rate, the natural difficulties to be overcome in point of climate and quality of soil far exceed those confronting the forester in the United States.





THE KARST, AUSTRIA

What the region looked like before reforestation

THE KARST: REFORESTED WITH AUSTRIAN PINE



WHAT THE KARST PICTURES TELL

SEVERN hundred years ago the police regulations of Triest forbade, under strict penalties, the felling or trimming of trees, the setting of fires, and the herding of stock in the country round about. Fifty years ago there was no forest on the land concerning which these regulations had been issued; no pasture; nothing to burn, even if the setting of fires had been attempted. In the interim the place had been laid waste. The regulations had been forgotten, superseded, or disobeyed, and the region known as the Karst, consisting of barren limestone without useful vegetative cover of any sort, presented a land prob-

lem which staggered the economists. Some 600,000 acres of profitless barrens were all that was left where for ages productive forests of conifers and hardwoods had once supplied ship timbers and other wood for the use of the Venetians. To-day, by forest planting, supplemented by protective measures where the ruin was less complete, about 400,000 acres of this waste have once more been brought into productive condition. Indirect benefits also have accompanied the restoration of the forest. Amelioration of the local climate has made possible the successful pursuit of agriculture on the adjacent tillable soils.

THE STORY OF MANTI

A Study in Cause and Effect

By WILL C. BARNES

HARDLY had the early Mormon pioneers established themselves in their city on the shores of the Great Salt Lake, when their leaders began pushing out exploring parties, with a view to spying out the land about them and locating smaller colonies of saints wherever the conditions seemed satisfactory.

With them, possession was the necessary nine points, and they could say to new comers not of their faith: "It's ours. We saw it first; please keep off the grass."

Eventually, the farsightedness of those men who were then at the head of the Mormon church was fully justified. By the time the rest of the west awoke to the fact that Utah was something besides a desert of sage and alkali, these industrious people had practically covered every available location in the state and, incidentally, had flowed over into a goodly slice of Idaho and northern Arizona.

Like the old Spanish conquistadores, these churchly pioneers carried in one hand the insignia of their faith, but in the other, instead of the sword, they held the irrigator's shovel—a much more peaceful and civilizing weapon. Down in the Wasatch Mountains in southern Utah, a small exploring band of these disciples of the Church of Jesus Christ of Latter-day Saints found a lovely valley, lying close under the great mountain range, where a rollicky little stream came dancing out of the hills. Wherever those Mormons found land and water lying in close proximity one to the other, there they located a colony and proceeded to wed these two resources, whose offspring are homes and prosperity.

The arable land lay right at the mouth of a great canyon, which wormed its way back into the dark forest-covered sides of the mountain. Here they laid out a town, broad as to streets, the lots measured by acres instead of feet, and in the center a "stake" house, such as all well regulated Mormon communities build almost the first thing.

They named the place "Manti" in honor of one of the ancient cities mentioned in the Book of Mormon. About the town lay the land—some 6,000 acres in extent—upon which, through irrigating ditches, the settlers carried the water from the creek, while beyond this was one of the best grazing areas in all the west. There seemed no limit to the grass and forage in the mountains. As they prospered, their herds swarmed over the range; they followed the snow as it melted in the warm spring sun when the ground was still wet and soft. They climbed to the very tops of the peaks with their sheep in search of feed, and there they stayed until the snows drove them out in the fall into the winter ranges.

Other herds than those belonging to Manti were driven from distant points to summer in these splendid pastures, and the stockmen were soon fighting for the ranges like wolves about a carcass. The feed was eaten off by their hungry animals as fast as it grew, until the whole area was swept bare of all its former cover of grass, weeds, and brush, as if a fire had passed over it. Finally, the Wasatch Mountains were but a "bed ground" for the stockmen's herds.

This was the condition when, in 1903, the government agents went into that region for the purpose of seeing what



MANTI, UTAH

A street after the flood of August 29, 1901

could be done to protect the forests in the mountains from fire and spoliation.

For several years previous to their coming, the little city of Manti had been devastated by floods that came rolling down the canyon from the mountains about them. These floods swept away whole farms, spread sand and silt over acres of fine farming lands, and deposited in the streets great masses of rocks and boulders. Families were ruined, and the value of property greatly depreciated. Many, believing the city doomed, moved away. The citizens fought these floods to the best of their ability and built huge dykes above the city in hopes they would turn the waters and keep them in the bed of the stream.

But all their work was in vain, for the dykes were swept away as are the sand forts built by the children on the seashore. Then they set about remedying the matter by looking for the cause of the floods. It was not a question of timber cutting, for while some timber had been cut from about the heads of the canyons, not enough had been taken to account for the floods.

The older settlers knew that when they first came to Manti, the hills and mountains round about were covered with a dense growth of grass, weeds, and shrubbery. Added to this there was a deep cover of humus, composed for the most part of decayed leaves, pine needles, and such matter. Into this cover the snows of winter and the rains of summer had soaked, to find their way, slowly and without erosive action, to the valleys below.

Then came the herds of sheep and cattle, and the hills were swept bare. The snow and rain fell upon a soil trampled by the stock until it was packed so hard that the water ran off it as from a roof. The ground cover, which once held the waters, was gone. And what the stock didn't do to make this destruction complete the fires did.

Then followed the floods.

Every one agreed as to the cause; the remedy was simple. They asked the government to set aside the mountains about them for a national forest and, when that was done, to prohibit the grazing of all stock upon the Manti watershed.

This was carried out, and the results were marvelous. The grasses soon came back; the weeds and underbrush again covered the ground, and, as fires were kept out, the barren, over-grazed areas began to resume their original appearance. The falling leaves and other decaying vegetation once more began to cover the bare ground, with its soft, spongelike humus, and Dame Nature has done her best to erase the scars due to man's stupidity and shortsightedness.

The floods, too, began to be less frequent and less severe, and for the last three years the little city of Manti has almost forgotten that there ever were any troubles over floods.

During the month of August, 1909, there was an unusual amount of rainfall in the area covered by the Manti forest. This was uniform all over the region, and from each canyon on the eastern slope of the range came heavy floods.

On the western slopes the same conditions prevailed and damaging floods swept down every canyon but that of Manti. The floods in the Ephraim Canyon, which lies immediately north of the Manti Canyon, did a great amount of damage to the little city of Ephraim, covering its fields and the streets of the town with a heavy deposit of mud, rocks, and driftwood. All these canyons on both sides of the range head in approximately the same region; all received apparently an equal amount of rainfall; yet the Manti Canyon alone was free from damaging floods.

The settlers living in the flooded regions are unanimous as to the reasons why they suffer from these annual flood troubles, whereas the Manti people do not, and they are now asking for similar protection to their watershed.

Then some stockmen from another section, seeing the feed on this watershed uneaten and, in their greedy eyes, going to waste, coveted it. They appealed to the Forester to allow them to graze their stock upon the proscribed area.

This appeal was as a trumpet call to the men of Manti. Almost as one, they begged the government not to allow any grazing upon their watershed. They pointed to the old conditions which existed before the mountains were set aside as a forest, and then to the present conditions, as full justification for the restriction. They urged that the prosperity of their community of more than 3,000 people was of far more value to the state of Utah than was the feed which the stockmen desired.

Nor did their pleading fall upon deaf ears. The request of the stockmen was refused. And, doubtless, just as long as the safety of the Manti fields depend upon the protection of these hills, so long will all stock be denied the privilege of grazing over them.

There are some who affect to scoff at these facts, but if they will go to Manti and study them they will find it hard work to convince those Manti farmers that the removal of the protective soil cover on their watershed had nothing whatever to do with the floods.



KNOWN BY THEIR FRUITS

The Ninth Annual Meeting of the Society for the Protection of New Hampshire Forests

By EDWIN A. START

NO STATE in so short a time has accomplished more in forestry than has New Hampshire in the last two years. A short time ago the Granite state was very backward for one with such extensive forest interests, but now it has taken a place in the front rank. This gave especial interest to the ninth annual meeting of the Society for the Protection of New Hampshire Forests, for it is largely through the unselfish and untiring efforts of this organization that the good results have been brought about.

The meeting was held on the 2d and 3d of August, in the Mount Washington at Bretton Woods, in the heart of the White Mountains, and among those present were many men prominent in New Hampshire affairs, and many members of the society from outside the state, for this organization draws much of its support from other states, so widespread and strong is the love of the New Hampshire hills and the forests that clothe them.

An interesting phase of the new order is the close cooperation between the society and the forestry commission of the state. The personal and selfish politics which for many years interfered with the efficiency of the commission have been done away with, and that body has become a clean-handed, clear-headed, vital force in developing the great forest interests of the state. At present it is headed by Robert P. Bass, of Peterborough, who has been an active agent in the work of reorganization from its beginning. As a member of the last

state senate, he did great service in securing the legislation which has put New Hampshire on its feet. He is now a prominent candidate for the Republican nomination for governor. Last January he was made a director of the American Forestry Association. With him are associated W. R. Brown, of Berlin, who represents one of the largest lumber interests of the state, and Gen. J. E. Tolles, of Nashua.

An indication of the new harmony between the commission and the society was to be found in the program for the first session of the Bretton Woods meeting. This was a meeting of town forest fire wardens of New Hampshire, under the auspices of the state forestry commission, Hon. Robert P. Bass presiding. Several of the wardens attended, all sections of the state being represented, and there was a live and intelligent discussion of methods of fighting forest fires and of the legal responsibilities of the wardens. F. W. Rane, state forester of Massachusetts, and C. R. Pettis, superintendent of state forests of New York, contributed to the discussion accounts of the fire laws and their administration in their states.

The second session, Tuesday evening, at which Hon. Frank W. Rollins, president of the society, presided, opened with an illustrated lecture by C. R. Pettis on forest planting. Mr. Pettis in his service for the state of New York, has probably done more actual forest planting than any other forester in this country, so that his description of this work and its conditions was of espe-

cial value and interest. After the lecture there were speeches by Governor Henry B. Quimby, Senator Henry E. Burnham, and ex-Senator W. E. Chandler.

Wednesday morning there was a talk by the state forester of New Hampshire, Edgar C. Hirst, which was really a report of progress. Its main features are therefore especially well worth summarizing here. The new forestry law of the state provides for a forestry commission and for a state forester, whose duty it is, under the direction of the commission, to have charge of all forest fire wardens in the state, and to aid and direct them in their duties. He is also to give educational lectures throughout the state, and, whenever he deems it essential to the best interests of the state, to cooperate with counties, towns, corporations, and individuals in preparing plans for the protection and extension of the forests. It provides for the appointment of a forest fire warden in each town, whose duty it is to extinguish fires when they occur, in doing which he may require the assistance of persons and the use of property. The expense of fire fighting is then shared equally by the town and the state. It is the warden's duty also to keep the town posted with fire notices and persons desiring to burn brush must in times of drought first obtain the warden's permission. Further provisions of the law prohibit the careless setting of fires and provide penalties for violations.

By the enactment of this law, which took effect May 1, 1909, the state of New Hampshire made a long forward step in its forest policy. Under this law, the forestry commission has endeavored to get the best results with the funds appropriated, and has been able to increase the scope of its work by cooperating with private individuals interested in forest preservation.

On July 1, 1909, a state forester was appointed and the first work begun was the appointment of forest fire wardens. It soon became evident that this would require considerable time, and, as fires were occurring in different parts of the

state, the wardens who had held office under the old law were asked to hold over until new appointments could be made. In this way other lines of work could be pursued and better men were secured as wardens than if the appointments had been made with undue haste. This method has been fully justified by the results. The state has a corps of wardens who are experienced fire fighters, interested in their work and prompt to act. They have posted about 10,000 cloth fire notices, have notified owners of portable sawmills about the use of spark arresters, and have prevented many fires by warning persons about the danger of burning brush in dry weather. In general, the law has worked well, and with a few minor changes will be a very effective law for the southern and central parts of the state.

The commission realizes that this system is not adequate to protect the wild mountain forest, and there is not enough appropriated by the state for this purpose. However, contributions from private parties have permitted the building of several mountain lookout stations, to be connected by telephone and used for fire patrol. Also several mountains are used where telephone lines have already been built. The mountains being used are: Magalloway, south of the Connecticut lakes; Signal Mountain, in Millsfield; Black Mountain, in Cambridge; Sugar Loaf, in Stratford; Pine Mountain, in Gorham; Mount Madison; Mount Agassiz; Mount Moosilauke; Mount Rosebrook; Mount Osceola; Mount Kearsarge; Mount Carrigain; Croydon Mountain. The value of these stations has already been proved by the quick discovery and extinguishing of fires that otherwise might have caused considerable damage and expense. Seven more stations, or twenty in all, would cover about all the wild land and make a very effective fire protection system for the mountain region.

Beside the administration of the fire law, and the work of cooperative protection, the forestry commission has been aiding private owners in the practice of forestry. Numerous applications

have been received for assistance and advice in handling woodland, but the forester has been able to visit only a few of the applicants. In some cases, a preliminary examination has been made and further investigations, plans for cutting, planting, and so on, have been carried out under the direction of the forester by a woodsman paid by the land owners.

As many applications were received from persons desiring to plant pines, an agreement was made with a nurseryman to furnish two-year-old seedlings at three to four dollars per thousand, according to the number purchased. The commission and the forester have started a private nursery in order to have thrifty transplanted stock on hand for those who wish to make a beginning in forest planting. It is hoped that an appropriation may be secured for a state nursery, so that this work may be largely extended.

Educational work has also been a feature of the commission's activities. During the past year the forester has made some thirty addresses and talks before boards of trade, granges, and various organizations. He also gave a course of lectures at the State College on the practicability of forestry in the pine, hardwood, and spruce lands of the state.

Mr. Hirst pointed out the following immediate needs, most of which require some legislative action:

1. *Forest Organization Districts.*—The state should be divided into four or five districts, according to watersheds, and a chief appointed for each district. Under this chief an efficient fire service could be built up, with firewardens, deputies, patrolmen, and so on.

2. *Lookout Stations.*—Stations already established should be taken over by the state, and enough more established to cover all the wild land. Good maps should be made to supplement the lookout work, and these should show all topographic features and the trails, logging roads, and all natural fire barriers, also the location of storehouses containing fire-fighting tools and provisions.

3. *Railroad Fires.*—The railroads should use oil-burning engines in dry seasons, or should use spark-arresters approved by the forestry commission; build fire lines along the right of way, and maintain patrols when

the commission thinks it necessary. At present, there is no law requiring even the use of a spark-arrester.

4. *Brush Disposal.*—There should be a law similar to that of New York, requiring the lopping of branches from the tops of softwood trees when logging operations are in progress.

5. *Minor Changes in the Law.*—(a) The dates between which brush cannot be burned without a permit should be fixed by law.

(b) Provisions for the payment of fire bills should be simpler, so that both bills and reports can be acted on promptly. (c) There should be a provision whereby a hunter who is careless with fire should lose his license.

6. *Stricter Enforcement of the Law.*—This will come as people become accustomed to the law. Nevertheless, prosecutions against offending parties should be pushed.

7. *A State Nursery.*—An appropriation is needed for a nursery that can furnish especially strong stock for those who are making a beginning of planting, and larger quantities of seedlings to others.

8. *State Cooperation with Private Owners.*—The department should be enlarged so that all who apply for assistance can get it. Some plan of state cooperation in planting cut-over and waste lands should be provided.

9. *More Educational Work.*—Bulletins on white pine and other profitable forestry trees should be issued as soon as there is a demand for such information. Bulletins should be issued to school children on various forestry matters, especially explaining the danger from the careless use of fire. Fire notices and fire laws should be printed in different languages, to make the foreign population more careful about fire. Exhibits at fairs should be made often, and the lecture work of the department should be extended.

10. *State Forests.*—The state should at once begin the purchase of small demonstration forests, and later should acquire some revenue forests.

Following Mr. Hirst's presentation of the work and needs of the state forest service, the reports of the treasurer of the society, Gen. George T. Craft, and of the forester were presented. The former showed a successful year financially and indicated the growing strength of the society. A great deal of this was due, it was pointed out, to the work of the chairman of the finance committee, Montgomery Rollins. The forester, Philip W. Ayres, reviewed the work of the society for the year, and especially what had been done and had failed to be done in connection with the Appalachian forests bill. The Senate filibuster was examined, with especial reference to the peculiarly malevolent at-

titude of Senator Burton of Ohio, and Mr. Ayres expressed himself somewhat pessimistically in regard to the prospect of the passage of the bill by the present Congress.

Addresses by the Hon. Frank D. Currier of New Hampshire and the Hon. A. J. Peters of Massachusetts dealt in detail with the same subject. Mr. Currier showed himself as graphic a narrator as he is a skilled parliamentarian, and his story of the strenuous fight for the Weeks bill in the House held the close attention of an interested audience and put his hearers in possession of all the essential facts. He was confident that the bill would pass the Senate in February, if not at an earlier date. Edwin A. Start, secretary of the American Forestry Association, who was called upon later, suggested the danger of the bill being thrown into conference by Senate amendments, and Mr. Currier, replying to a question by Mr. Start, expressed his belief, unqualifiedly, that the friends of the measure in the Senate would vote down all amendments and pass the bill as it came from the House.

Ex-Governor Jordan and ex-Senator Chandler were among other speakers at this session. Mr. Jordan brought out the interesting fact that John W. Weeks, the grandfather of Representative John W. Weeks of Massachusetts, the author of the Weeks bill, who represented New Hampshire in the national House of Representatives, assisted, ninety years ago, in naming the peaks of the Presidential range. The ex-governor advocated more care by the state of its own forest lands and less dependence upon national action. Mr. Start emphasized this plea and pointed out the need of the development of American forestry through national, municipal, state, and private action, so correlated and combined as to secure the complete utilization of our forest lands for the fullest continuous production, the national forests forming the nucleus, to be completed and rounded out by the state, the municipality, and the private owner.

There was an interesting discussion of forest taxation, led by Allen Hollis,

secretary of the society, who has given this subject much attention. D. M. Rogers, who has charge of the gypsy and brown-tail moth work for the United States Department of Agriculture, gave a talk on the invasion of the state by these pests, which aroused much interest, as was shown by the rapid fire of questions to which Mr. Rogers was subjected. He held out no hope of entire freedom from this danger, and said most emphatically that the state must adopt a more energetic and liberal policy. He said that conditions as to gypsies are bad in the eastern part of the state and threaten to be worse in other parts. The state cannot appropriate enough money to solve the problem. So far as possible, each town should hire a competent man to superintend the work of control. In the last analysis, it is up to the property owner. Above all, this state needs a man to head the fight who knows the gypsy from A to Z, and who can instruct town officers and property owners. He considered the mountainous northern section of the state as beyond the range of the moths, although he did not regard this as conclusively proved.

Wednesday evening, Austin F. Hawes, state forester of Vermont, gave a sound and suggestive paper on state and town forests. This paper will appear later in AMERICAN FORESTRY.

The society reelected its officers, all of whom have done efficient and devoted service: President, Frank W. Rollins; secretary, Allen Hollis; treasurer, George T. Cruft; county vice-presidents, James A. Tufts, William D. Gibbs, the Rev. Daniel Merriman, Charles E. Tilton, William P. Fiske, Isaac Huse, A. T. Childs, Frank H. Foster, Laurence J. Webster, W. C. R. Hale; vice-presidents at large, Herbert Myrick, Henry S. Graves, John D. Quackenbos, Allen Chamberlain, Henry James, Jr., Orton B. Brown, Frank G. Webster, E. Bertram Pike, John S. Runnells, George H. Maxwell; executive committee, Frank W. Rollins, Allen Hollis, George T. Cruft, Robert P. Bass, Montgomery

Rollins, Robert E. Faulkner, Winston Churchill.

Resolutions were adopted authorizing the executive officers to accept gifts of forest lands to the society, if provision be made for the attendant expenses; providing for a committee of two to consult with railroad officials concerning methods of avoiding forest fires; expressing the thanks of the society to the New Hampshire delegation in Congress for their efforts in behalf of the Weeks bill and expressing hopes for its success; requesting President Taft to urge upon Congress early action upon the Weeks bill; authorizing a committee of three to meet individuals and representatives of corporations to plan better cooperation in forestry matters.

This was the first meeting of the society since its incorporation, which is in itself an act of some significance, since the society was incorporated to enable it to become the custodian of forest lands. Residents of the Lake Sunapee country have been exerting themselves to prevent the stripping of a tract of several hundred acres on Sunapee Mountain. Their efforts are about to be crowned with success, and the land when acquired will be placed in the hands of the Society for the Protection of New Hampshire Forests. Thus the work of the society will acquire a new value, and it will have an opportunity to put into practice the principles it has advocated.

THE PHILIPPINE BUREAU OF FORESTRY AND ITS WORK

Prepared under the Direction of George P. Ahern, Director of Forestry, by
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[In the February and March numbers of AMERICAN FORESTRY, Barrington Moore discussed the conditions and problems of forestry in the Philippines. The present article, prepared several months ago for this magazine, is a statement of conditions from the men who are facing these problems.]

PURPOSES FOR WHICH CREATED, AND POWERS

THE Bureau of Forestry is intrusted with the control and management of all public forest land, and no public land of any kind can pass into private hands without the sanction of this bureau. The following sections of "The Forest Act" of May 7, 1904, will serve to show in a general way the purposes for which the Bureau of Forestry was established, and its powers:

"Sec. 2. The public forests and forest reserves of the Philippine Islands shall be held and administered for the pro-

tection of the public interests, the utility and safety of the forests and the perpetuation thereof in productive condition by wise use; and it is the purpose of this act to provide for the same.

"Sec. 3. The public forests shall include all unreserved public lands covered with trees of whatever age.

"Sec. 4. Upon the recommendation of the Chief of the Bureau of Forestry, with the approval of the Secretary of the Interior, the civil governor may set apart forest reserves from the public lands, and he shall by proclamation declare the establishment of such reserves and the boundaries thereof,

and thereafter such forest reserves shall not be entered, sold, or otherwise disposed of, but shall remain as such for forest uses.

"Sec. 5. The public forests and forest reserves and the timber, firewood, gums, and other products thereof, shall not be sold, entered, leased, or otherwise disposed of except as herein provided.

"Sec. 8. The Chief of the Bureau of Forestry, with the approval of the Secretary of the Interior, shall prescribe such regulations not inconsistent with the provisions of this act as may be expedient or necessary for the protection, management, reproduction, occupancy, and use of the public forests and forest reserves, and the said chief, with the approval of the Secretary of the Interior, is hereby authorized to alter and revise such regulations. He shall in particular provide for the use of the public forests and forest reserves in such manner as to insure for the future a continued supply of valuable timber and other forest products.

"Sec. 10. The Chief of the Bureau of Forestry, with the approval of the Secretary of the Interior, may select for sale or disposal, and may sell or dispose of by license, from the public forests and forest reserves, at rates of charge to be established by him in accordance with the provisions of sections 11 and 12 of this act, any timber, firewood for commercial use, gums, resins, and other forest products, whose removal will not be detrimental to the public forests or forest reserves or to the interests which depend upon them.

"Sec. 20. The Chief of the Bureau of Forestry, with the approval of the Secretary of the Interior, may, when the public interests so require, make requisition upon the bureau charged with public surveys, to proceed to demarcate, establish on the ground, and erect monuments along the boundaries of any public forest or forest reserves, and it shall be the duty of the last-named bureau to comply with said requisition.

"Sec. 23. Every official, employee, or agent of the Bureau of Forestry is empowered to make arrests without process

in or upon the public forests or forest reserves, or territory adjacent thereto, of any person who is committing or attempting to commit any violation of this act or the regulations established thereunder, and it shall be the duties of governors of provinces, the Philippine Constabulary, and of municipal presidents to assist in making the arrests prescribed in this section when called upon to do so.

"Sec. 25. The cutting, clearing, or destroying of the public forests or forest reserves, or any part thereof, for the purpose of making *cañigins*,* without lawful authority, is hereby prohibited, and whoever, in violation of this provision, shall cut, clear, or destroy the same, for such purpose, or shall wilfully or negligently set fire thereto, shall, upon conviction by a court of competent jurisdiction, be punished by a fine not exceeding a sum equivalent to twice the regular government charge upon the timber so cut, cleared, or destroyed, and, in addition thereto, by imprisonment not exceeding thirty days, in the discretion of the court.

"The cutting, collecting, destroying, or removing of timber or other forest products, stone, or earth from the public forests or forest reserves for any other purpose than making a *cañigin*, without license, permit, or other sufficient authority, is hereby prohibited, and any person who, in violation of this provision, shall so cut, collect, destroy, or remove the same, by himself, through an agent or employee, or for account of another, shall, in addition to the payment of the regular government charge on such timber, forest products, stone, or earth, be subject to the payment of an additional sum equivalent to the regular government charge thereon, which shall be collected as in this act provided in the case of other government charges."

The Public Land Act provides that no application for homestead, sale, or lease of public land will be granted un-

**Cañigins* are a system of shifting cultivation extremely destructive to the forests. See AMERICAN FORESTRY for March, 1910, p. 78.

less it is certified by the Bureau of Forestry that the land is "more valuable for agriculture than for forest uses."

The laws contained in the Forest Act are all that could be asked for as a basis upon which to build up a proper system of forest conservation for the Philippines. All that is needed is more money and trained forest experts to carry on the work.

PRESENT WORK OF THE BUREAU

The work of the Bureau of Forestry is carried on under two divisions—that of administration and that of investigation.

The work of the division of administration includes: Granting and inspection of timber licenses, including cutting regulations to perpetuate the forest; patrol against *cañigins* and trespass; fines for violations of the Forest Act; inspection of public land applied for to be leased, bought, or homesteaded; working plans for large lumber concessions in cooperation with division of investigation. For carrying out the above lines of work, the islands are divided into three administrative districts, with a trained American forester in charge of each, assisted by a number of Filipino rangers. The forester is continuously on the move, and even then is barely able to cover his entire district once within a year, and much of the work has to be done by rangers working alone.

The work of the division of investigation includes: Mapping and land classification; dendrological work; education and publication; silvicultural investigations, and working plans.

The division is mapping the different classes of land, or broad vegetative types. It has already completed Luzon and Mindoro, the maps showing roughly the location of the following classes of land: Commercial forest, non-commercial forest, grass land, and land under cultivation. These maps furnish the basis for determining what areas should be permanently held in public forests or forest reserves and so managed as

to secure a continuous timber supply, the protection of watersheds, and a revenue for the insular government.

The dendrological work includes the botanical identification of tree species, and technological study of the structure, characteristics, and quantity of the woods of different species. This work is carried on in cooperation with the Bureau of Science. The work includes, also, timber testing and durability tests, wood preservatives, and uses and market value of the different kinds of woods. A museum of specimens of Philippine woods has been established, and the public has access to the information relative to Philippine woods collected by the division of investigation.

Education and propaganda work in forestry is under this division, including publication of results of forest investigations and forestry work. The aim is to educate the people to the importance of forest conservation; to keep the people informed concerning the actual work in forestry of the bureau, and its results, and to indicate chances for profitable exploitation of Philippine forest resources. This is done through publications of the bureau, by newspaper and magazine articles, and by illustrated lectures. The Bureau of Forestry must have the hearty support of all patriotic Filipinos, and hence the importance of this propaganda work.

The silvicultural investigation work includes studies of natural and artificial reproduction, especially of important species; forest types or associations of tree species in the forest; rate of growth and form of different species, with mill-scale work to determine how much lumber trees of different sizes and species will cut.

Working plans, or plans of management for areas of public forests which should be permanently held in forest, are prepared by the division of investigation in cooperation with administration. The work of the former furnishes the basis for proper forest management of public forests by the latter division—it investigates, collects infor-

mation, and organizes the work to be subsequently carried on by the division of administration.

WORK OF THE BUREAU FOR THE
COMING YEAR

Commencing with July, 1909, the work of both divisions of the bureau will be concentrated upon the organization of systematic forest control for areas in northern Negros Occidental and in Bataan. General administrative work will be attempted for the first homesteads, for the three districts will continue as before, but detailed forest work will be attempted for the first time on the two areas mentioned. The plan is to take additional areas each year for organization and subsequent practice of detailed forest control and management, until all public forest, which should be retained as such, is taken in hand. The work in Bataan and Negros will form the commencement of this work. Up to the present the administrative work by the Bureau of Forestry on public forest land has been of a very general character, but the bureau has been investigating and locating areas for future intensive administration—areas which the general welfare of the Filipino race demands should be permanently held in public forests, managed in accordance with the principles of forestry. During the latter half of the fiscal year the division of investigation will resume the work of mapping the different classes of land and will probably complete the land classification map for the Philippines.

The limits of the Negros and Bataan forests have been very roughly located; there are probably about 160,000 hectares in the former, and 80,000 in the latter. The Insular Lumber Company is located in the Negros forest, and the Cadwallader Lumber Company in the Bataan forest, which are the two largest companies in the islands, and an important part of the work will be mill-scale and volume work to check up the amount of timber cut by these companies. This will include, also, the collection data as a basis for volume tables

of standing trees, showing the amount of lumber in standing trees of different diameters and species; and for tables showing the amount and grades or quality of lumber cut from logs and trees of different sizes and species and the per centage of waste due to rot, shake, and careless sawing. This information will be of value to all lumbermen in the Philippines and to those intending to go into the lumber business. The bureau by this detailed mill study will determine the most economic methods of milling Philippine timbers and will be able to make recommendations for changes in present methods which will mean a saving to the lumbermen.

The chief forestry work on the Negros and Bataan forests will be in the collection of data as a basis for a detailed working plan or plan of management for the two forests, including topographic and forest maps of the same, with the probable limits of the area which should be permanently held in forest. This data will be gotten more or less in connection with the work of patrol and cutting of trails, which are also important lines of work. For the purposes of patrol, both of the forests have been divided into three range districts, with an educated Filipino ranger in charge of each, and each of these districts subdivided into a number of patrol blocks with Filipino guards to patrol them. Trails will be cut, where there are none already, as boundaries between ranger districts and patrol blocks, and secondary trails made cutting up each patrol block into a number of sub-blocks. These trails will be used for patrol and will be useful as fire lines in case of fire. Topographic and forest data will be collected for each sub-block by surveying out all trails cut, and taking careful topographic and forest notes while running out these trails. In the working plan each sub-block will have a separate description, including the character and condition of the forest, an estimate of the timber, and recommendations as to work to be done—improvements, such as tree plant-

ing, and cutting and logging regulations to perpetuate the forest in case of lumbering.

For the working plan, much information of a political and social nature will be collected: Card catalogue of all officials and influential men, with remarks; lists of licensees, and all men using the forest and on whom dependent; land status work, including location and history of all claims; location of all people in the forest, including a special study of the non-christian tribes (Montescos, Negritos, etc.). It will be the policy of the Bureau of Forestry to encourage ignorant natives in becoming independent farmers, cultivating homesteads of their own. These natives should be encouraged in taking up homesteads on good land, much of which is illegally held by caciques, and not allowed to go back into the forest to make *cañigins* in poorer soil, where they destroy much valuable timber.

In connection with the work of organizing these two permanent forests, the bureau will undertake to establish communal forests for neighboring barrios and municipalities, on the public land most conveniently located to them, from which timber for personal use can be taken without a stumpage charge. This will check the villagers from going a great distance back into the forest to get their timber for personal use, where they do much damage to the forest. Where there is no public forest near the town, the municipality will be encouraged to establish one by planting up public grass land and every assistance possible in the work will be given by the bureau. Experimental planting work in connection with the different municipal schools will be carried on by the Bureau of Forestry, cooperating with the Bureau of Education, which will be a good way to start planting of communal forests.

The general administrative work on the Bataan and Negros forests will include: Granting of licenses to cut timber and other forest products, with regulations as to where and what shall be taken, in order to preserve the productivity of the forest; fines for viola-

tions of licenses; fines for violation of the Forest Act and the forest regulations; *cañigins* without license stopped; inspection of homesteads; more rigid examination and requirements for the approval of the same, and the collection of stumpage charges on forest products in cooperation with municipal treasurers and the Bureau of Internal Revenue. At present the work of collecting stumpage charges is in the hands of the Bureau of Internal Revenue, and is done mainly through municipal treasurers. It is very difficult for these officials, not experts in timber and never getting back into the forest, to properly handle this work. The Bureau of Forestry, cooperating with the municipal treasurers, will be able to secure for the government a much larger revenue from forest products cut in these two forests than has been heretofore collected.

FUTURE NEEDS OF THE BUREAU

"The Bureau of Forestry has in its possession to-day the necessary information and a nucleus of the force to start an active, efficient administration of what should be permanent forest land in the islands."¹ What it will need more and more, in addition to trained Filipino foresters, will be increased appropriations for carrying on the work. This could be provided for by allowing sixty per cent or more of the revenue derived from forest products sold from public forests to be used, under the direction of the Bureau of Forestry, for the maintenance and improvement of the forests.

"In all countries where forestry has been practiced for a long period of years, there has been a steady increase of the revenue from the forest, and this increase has been directly dependent upon the amount spent in the care and protection of these forests. In Prussia in 1850 the government annually spent

¹Circular No. 3, Bureau of Forestry.

P1.85² per hectare, and received a net revenue of P2.30 per hectare. In 1897, the same government spent P6.90 per hectare, and received a net annual revenue of P6.30 per hectare. This is not an isolated case, but is true for the forests of other European states. Careful observation during a long period of years has established the fact that there is a minimum expenditure per hectare for maintenance of forests: anything under this minimum means lack of proper care and a deterioration of the property; and anything in excess, up to a certain point, means improvement of the property, and an increase of revenue."¹

With sixty per cent of the revenue from the sale of forest products, and with the constant increase of the amount this would yield, as would be the case, the Bureau of Forestry would have all the revenue needed for conserving and improving the productivity of public forests. For the first five years, however, the bureau should be allowed all the revenues from the sale of forest products, to provide for the heavy ex-

pense of organizing and making working plans for the different forests throughout the islands, and for the technical and practical training up of Filipino foresters.

In India the cost of administration of the area under forest management is slightly more than fifty per cent of the gross revenue derived from the sale of forest products from the same. The net revenue there is 39 centavos³ per hectare. With an equally intensive system of forest management for Philippine forests, a like net revenue could, after a short period of years, be expected. Assuming that twenty per cent of the land area of the archipelago, or 6,000,000 hectares, should be put under forest management similar to Indian practice, the total yearly net revenue therefrom to the insular government would be P2,340,000. This is not considering the value of these forests for protection of watersheds and for a continuous supply of cheap lumber for the people of the Philippines, secured by forest management.

²These figures are in terms of Philippine Island currency. P indicates peso, which has a value of 50 to 55 cents, United States standard.

³The small coin of the Philippines, one-one-hundredth of the peso, or one-half cent of our money.



EDITORIAL

The Second National Conservation Congress

THE keynote of the Second National Conservation Congress is the constructive application of conservation principles to concrete problems. The White House Conference of May, 1908, brought the issue before the country; it showed the need of action, made a direct appeal to patriotism, and energized the movement. The next landmark was the inventory of natural resources published in the report of the National Conservation Commission. Though necessarily incomplete, this was a fully adequate presentation of the basic facts and a succinct formulation of cardinal principles. St. Paul marks the third stage of the advance. The great interests concerned with the problems of conservation will be represented there by men who are leaders in the development of natural resources. These men will attack actual cases and advance definite recommendations, in the light of their business experience and trained ability.

From the program it is evident that the several topics are to be handled from the inside. Such men as A. L. Baker and Wallace Simmons of St. Louis, and T. L. Lewis, president of the United Mine Workers of America, will deal with the industrial aspects of conservation. Forestry will be represented by Henry S. Graves, and water power by Herbert Knox Smith. Judge Ben D. Lindsey, of the Denver Juvenile Court, will discuss the conservation of child life. Dr. Francis E. McVey, of the University of South Dakota, a noted authority, will present a paper on forest taxation, while the discussion of this topic will be conducted by J. B. White, of St. Louis, whose influence in the

lumber world, and effective work in introducing conservative methods into lumbering, are well recognized.

A conspicuous place on the program will be occupied by the topic of public land legislation, with special reference to the proper development of such major resources as minerals and the public range. Another important and practical feature will be the reports of the conservation committees of the great business organizations of the country which have been devoting themselves to the mastery of the problems encountered in their respective fields of enterprise. It is expected that these reports will contribute much new information, many workable suggestions, and not a few positive results.

Special interest centers, naturally, about Mr. Pinchot's address on "The Program of Conservation." Those who talk at random against conservation have been asserting that Mr. Pinchot has thus far failed to lay down definite lines along which the ideal of conservation can actually be approached. We consider this criticism altogether unfounded, and believe that those who make it have not taken the pains or felt a desire to acquaint themselves with Mr. Pinchot's brilliant achievements in constructive conservation work. In this address, however, Mr. Pinchot will accept the challenge that has been offered, and will attempt to present a very definite program. This is an exceedingly difficult task. It calls for a rare combination of expert knowledge and constructive statesmanship, a complete command of the subject on both its theoretical and its practical sides. There is no doubt, in our judgment, that he will be entirely equal to the emergency and will acquit himself in a manner which will leave little to be desired.

A Bluff Called

ON ANOTHER page is printed an address delivered by the Forester of the United States before the Denver Real Estate Exchange on the 3d of August. Frequent attacks have been made upon the Forest Service for its alleged policy of shutting homesteaders out of the public lands, thwarting the ambition of the pioneer, and checking the development of the country. This agitation has been especially active in Colorado, where the high altitude sometimes engenders marked extravagance of language. It is characteristic of the direct, incisive methods of the Forester that he went straight to the storm center and examined the situation on the ground in company with some of the severest critics of the Service. To those who have had knowledge of the real situation it has been known all along that the harsh criticisms that have been made have been due in part to exceptional cases of over-zealous administration, but chiefly to persistent misrepresentations, combined with a certain amount of misunderstanding of the laws, the conditions, and the real purpose of the administrators. The latest advices indicate that Mr. Graves has been able to go upon the ground and disprove, even to the critics of the Forest Service, so far as the Colorado forests are concerned, the charges that have been so vociferously made. Admitting that the land pointed out to him is agricultural, he has shown that, instead of amounting to "millions of acres withheld from settlement," it amounts to some patches of a few thousand acres, isolated and in high altitudes, the applications for which have been few, while some of the claims taken up have been abandoned by the settlers. These facts make the sounding charges that have been made look small indeed. Under the Forest Homestead Law of 1906, land suitable for cultivation is made available for settlers as far as applications are made for it, and agricultural lands on the outskirts of the forests are being eliminated from the forests and thrown open to settlement

by the rectification of boundaries, which is going on rapidly as a result of careful surveys, a work of which the readers of this magazine are kept informed from month to month. Ample provision must be made for administrative purposes, as Mr. Graves points out, because a force of rangers and other employees must be maintained for the good of the forest, and it may be added that the welfare and proper maintenance of these men are just as important as those of any other settlers.

In view of these facts, and knowing the honest purpose of the Service and the character of the man at the head of it, it may safely be predicted that he will be equally successful in other cases, or that any real wrongs that exist will be righted as far as the laws permit.

Terrific Fire Losses

UNLESS the general reports of forest fires are more than usually unreliable, the summer of 1910 will leave a conspicuously evil record of irreparable damage done. The known losses are appalling.

Early in the season great dryness started the mischief ahead of time, and throughout some of the choicest timber regions of the northwest the flames have been raging almost continuously ever since. From Wisconsin and Michigan it was recently reported on trustworthy authority that, even if every fire in the country were then extinguished, and no more should start during the rest of the season, the summer would go down in history as the costliest that lumbermen have ever known. The *Portland Oregonian*, toward the end of July, estimated that the total loss in timber and property up to that time in British Columbia, Idaho, Washington, and northern California at \$100,000,000, or double the average annual fire toll; and Montana, where enormous losses are being suffered as this magazine goes to press, was not included.

August 2, in accordance with telegraphed requests from the Western Pine

Manufacturers' Association and the Western Forestry and Conservation Association, the President of the United States wired the Assistant Secretary of War to direct commanding officers of army posts, upon application by the Forest Service, to lend every assistance possible in the suppression of fires. Action was immediately taken by the Service to avail itself of this general opportunity to secure the cooperation of troops. By August 13, some 2,000 men in the employ of the Service were being assisted along the fire-fighting lines by sixteen companies of soldiers where the worst fires were blazing, namely, in several of the national forests of Idaho and Montana and in the Blackfeet Indian Reservation. The Secretary of the Interior also took steps to secure the aid of the Forest Service in fighting fires on the Glacier National Park, which, like the other national parks, is under the jurisdiction of the Department of the Interior.

Thus, all available machinery was promptly set in motion to save the public timber. At this writing, however, it is doubtful whether the greater fires are yet under control. Enough is already known about the situation in the forests to make it certain that they have suffered more heavily than at any time since they were placed under the jurisdiction of the Forest Service. The vast extent of the public property involved may be seen from a single instance. In one forest in Montana there was threatened 400,000,000 feet of timber in a mass, the market value of which was \$4 a thousand on the stump. The expense of fighting fires on the people's property, as this is written, can hardly be less than \$15,000 a day. No one can really conceive the damage that is being done to the future forest in the injury and destruction of young growth.

Fire is not a mysterious enemy. By the proper means it can be met and conquered, and indeed largely held back from the invasion of the forest. The best methods of prevention are known and effectual. The weakness in the situation is lack of men and money for

adequate protection. Surely, the national forests ought not to be exposed to such losses by a penurious policy which leaves a mere handful of men to patrol and protect the large areas that are repeatedly placed in danger. Not to speak of economic waste, duty to the public, respect for the good name of the Nation, require that Congress, without further delay or argument, should give funds enough to keep the national forests at all times fully manned.

Mr. Roosevelt and the English Song Birds

IN *The Outlook* for August, Mr. Theodore Roosevelt writes of English song birds and their songs with as much obvious zest and discrimination as if to see and hear them had been one of the main objects of his visit to England. One day, between the funeral of King Edward and the Guildhall speech, he found or made the time, amidst official, social, and academic honors and opportunities that would have bewildered a head less sound and flattered a man less sincere, he stole away into the fields and woods with a delightful and learned companion, and there made first-hand acquaintance with the singing birds which till then had been his friends only in familiar books. And now, while still, as always, very fully occupied, and at the same time playing a public rôle that calls constantly for great tact and wisdom, he once more finds or makes the time to tell American readers of this naturalist's excursion.

Altogether apart from the charm and value of the *Outlook* article as a contribution to bird-lore, this characteristic episode of Mr. Roosevelt's days in England carries a stimulus and a challenge. Is any one of us more engrossed with large affairs, or weighted with graver responsibilities, than was Mr. Roosevelt when he dropped for half a day out of the insistent world and harkened eagerly to the notes of the nightingale, the cuckoo, and the English robin? We take both our business and ourselves too seriously. Our sense of proportion is

benumbed, because we have too long laid one-sided emphasis on isolated projects and pursuits. We are possessed by our daily tasks; we can no longer shake ourselves free of them. We quickly lose the power of interesting ourselves in anything except the immediate objects of our endeavors, which are magnified under our unflickering attention till they react upon us hypnotically, enslaving us to them. We come to consider ourselves too busy to spare the time for any pleasure, any duty, that does not seem to belong in the little world to which we have deliberately restricted our thinking and our feeling. Freshness of perception is dulled, elasticity of mind stiffens, sympathies contract, in the unswerving pursuit of single aims.

Once again the many-sided Mr. Roosevelt has reminded us that the world has countless interests, and shown us how to turn, with equal profit and enjoyment, from the greater to the lesser elements of a fully rounded life. It is a lesson sorely needed. When we have mastered it the greater tasks that engage us—perhaps not so great as our habits and conceits would make them—will no longer hold absolute dominion over us; we shall begin to live more completely. It will be easier then to reach the busy man, become less busy in his own eyes, and to engage his interest and help, whether it be in some vast project in his own specialty or something far more remote, such as a plan to conserve forests which he has never seen, for a future which he cannot himself enjoy.

Consistency

BULLETIN No. 5 of the National Conservation Association summarizes and criticizes the legislation dealing with the development of natural resources which was passed or considered by the last Congress. The gist of the results accomplished is given in the following words:

"The National Conservation Association has substantial cause for satisfac-

tion in the progress achieved during the session of Congress just closed. In spite of all opposition, the principles for which we stand have been enacted into law in a considerable number of cases, and are represented in many bills still awaiting action. More than one avenue to monopolistic grabbing of the people's property has been closed, but much still remains to be done. The friends of the conservation movement are in better position to continue the fight than seemed possible when the session of Congress began.

"Throughout the session the association followed the legislative situation closely. Its officers, through bulletins, have endeavored to keep all members informed regarding the more urgent measures favorable to conservation and those opposed to it. The officers of the association are keenly sensible of the vigorous cooperation on the part of its members toward the enactment of good conservation laws and the defeat of proposed bad legislation.

"Early in the recent session Senator Nelson introduced nine conservation bills drafted in the Interior Department. These bills, which were described in the first Bulletin sent to the members of the association, were mostly bad. The Timber Sale Bill (S. 5489) in particular was wholly indefensible. For five of these bills substitutes (H. R. 23698 to 23702 inclusive) embodying conservation principles were prepared by the association, covering all important phases of the conservation program of the administration. These were introduced by Representative Gronna of North Dakota, and are before Congress for consideration at its next session. The substitute for the Withdrawal Bill suggested by the association was enacted into law with amendments. * * * The three remaining conservation bills proposed by the administration, which were of relatively small importance, were passed in a form different from that in which they were introduced, and one of them in greatly improved form. The act for issuing \$20,000,000 of bonds to hasten the com-

pletion of reclamation projects (Public 289) was advocated by the administration."

The Bulletin closes with a notable paragraph:

"It is unfortunate that the Interior Department has absolutely refused to approve rights of way for municipal water supply, irrigation, and water power wherever the lands affected are believed to be valuable for water power. This policy has continued for a year. It amounts to the absolute stoppage of water power development throughout the arid west, and has done much to create the totally false conception of conservation in that region. The Forest Service has wisely rejected the proposals of the Interior Department looking to the establishment of the same policy in national forests."

Mr. Ballinger has not hesitated to let the country know that he has very decided opinions upon conservation, and it was gathered from repeated statements that one of his ideas is to open up resources and prevent the discouragement to enterprise that would follow unwise restrictive measures. True, this idea was not the Secretary's own by right of discovery, because it is part and parcel of the conservation program as it was arranged by those who were its true originators. But it seemed as unmistakable as anything the Secretary has put into words—and the Secretary is inclined toward calling a spade a spade at the very least—that he was practically and theoretically opposed to a sort of conservation which nobody, after all, was advocating. It is therefore somewhat disconcerting to find that in one direction he appears to be determined to restrict, instead of properly developing, the use of one of the great resources of which he has control.

Two Remarkable Examples of Reforestation

THE illustrated article by Mr. Hovgaard in this issue of AMERICAN FORESTRY on the "Reforestation of Denmark," together with the pictures and notes of forest plantations in the Karst

of Austria, may well arrest attention. In both of these instances, so different and so widely separated, effect has followed cause, not once but twice; first, when the forest was stripped away and the land was laid waste, and second, when the forest was replaced by painful experiment and the land became again productive. In both cases, too, the evil effect of forest removal, as well as the good effect of forest restoration, has been shown in a very definite influence upon local climate; agriculture was stopped or impoverished when the forest masses were removed, and was revived and developed as they were put back.

But, of course, the chief lesson so powerfully enforced by these examples is that the possibilities of forest production are almost unlimited. The work in Denmark and in the Karst was done not only against the deterring weight of general indifference and incredulity, but to some extent in defiance of expert opinion. In Denmark particularly, it was sheer pluck and insistence, backed by patriotic sacrifice and the outlay of private funds, which converted the devastated heath to woods and pastures and fields, through unfaltering belief in the forest as a crop and as a protector and improver of the soil.

In the Sandhill region of Nebraska a problem of similar difficulty confronts the American forester, and it is a source of satisfaction that in Brussels, Belgium, this month, an American professor of forestry will be able to present the results of successful national work in that region, before the International Association of Forest Experiment Stations. But the opportunities are endless, and barely a beginning has been made in the work of reforestation here. There is great encouragement, therefore, in the successful object lessons furnished by Denmark and by Austria.

Sharp Practice in the Basket-willow Industry

CONDITIONS have been brought to light in the basket-willow industry which are exceedingly unsatisfactory both to the grower and to the consumer.

At best, willow growers have to meet the competition of split-wood baskets, as well as that of the cheap imported willow-ware which floods the American market in spite of a relatively high tariff. But the chief difficulty they have to face, in certain centers at least, has neither economic nor moral justification. This is the pressure of monopoly, brought to bear by the middlemen. There is danger that the future development of the industry will be seriously hampered unless this pressure is relieved.

The basket-makers who have in the past grown the greater part of the willows produced in this country have been immigrants from the willow-producing centers of Europe, with only a slight knowledge of the English language and no knowledge of business methods. As a consequence, it has been a simple matter for men with capital to gain almost a complete monopoly of the willow-growing business. Years ago, when most of the basket-makers came to this country, there was an open market for both raw material and manufactured goods. As a rule, the more industrious then made a good living. Most of them were soon able to pay for a home and a few acres of land. Gradually, however, as the industry grew larger, the influence of the middleman began to be felt. At first, jobbers paid good prices; but as they gained more and more control of the market they began to "squeeze" here and there. The small grower, with his year's work tied up in his willow crop, was an easy mark for capital. Before long, he found that he must either do business with the jobber or not do business at all. If he tried to sell his crop independently, he was underbid, and the need of cash prevented him from holding his crop or disposing of it in small lots. Thus, most of the growers who continued in the one-sided game were forced into line.

To-day, in certain localities where there should be a fair profit in willow growing and in basket-making, the big dealers so manipulate things that they get the profit both ways, and hardly a living is left to the willow producer or to the basket-maker. In fact, many growers and basket-makers who formerly were prosperous do not now even own their homes, and mortgages cover everything they possess. The mortgages are largely held by the big willow dealers, who thus have complete control of the situation.

This evil state of affairs is not universal, it is true. In the middle western states it is far less grave than in some parts of the east, though even there the middleman undoubtedly gets some of the profits which should go to the producer or consumer of raw material. In Indiana and Ohio, especially, the growers get good prices, owing to the open competition among the buyers and users of willows; and in these places willow culture is prospering. But the bulk of the willow crop is raised in the east, over a good part of which monopoly presses heavily.

The harmful results of such a system hardly need to be pointed out. Who will embark in an industry in the face of this sort of discouragement? The production of willows must decline. Those who can get out of the business will do so, and those who cannot get out, because of limited resources or limited skill, tend to become little better than slaves. Lower quality and higher prices will impair the market for the product, and subject the consumer to the hardship of paying more for poorer ware. It is high time that intelligence and enterprise should take hold of this situation, free the industry from this costly burden, and assert their claim to a legitimate share of the profits.



NATIONAL FOREST WORK

Cruising Southwestern Forests

The task of estimating the present stand of saw timber on each township and section of national forest land in the states of Arizona, New Mexico, Arkansas, and Florida has been undertaken. It will probably take until the close of the year 1912 to complete the work, but when it is done the government will know definitely how much timber can safely be cut from the national forests in these states, and just where the timber is that can be most advantageously sold.

When a forest has once been covered by such a reconnaissance, purchasers and forest officers can agree on negotiations for timber sales, advertisements of the timber can be placed, bids made, and contracts let. Up to the present time, in Arizona, all the saw timber on the Coconino forest has been cruised, including the Grand Canyon division; all on the Prescott; more than half of the Sitgreaves, about one-fifth of the Apache; in New Mexico, the Gallinas Division of the Lincoln, and half of the Pecos. Field parties are now at work in Arkansas on the Arkansas National Forest, and in Florida on the Choctawhatchee.

During the present field season, it is anticipated that the estimates covering the Apache, Gila, and Pecos, in New Mexico, and the Mount Graham Division of the Crook, in Arizona, can be completed, and that for the Manzano, in New Mexico, which was estimated in 1908, thoroughly revised. During the winter of 1910 and 1911 undoubtedly the Choctawhatchee and Ocala, in Florida, and the Arkansas and Ozark, in Arkansas, can be finished. Thus, it is likely that by 1913 all saw timber in District 3, which comprises the forests of the south and southwest, will be cruised and mapped so that purchasers can negotiate sales promptly and the government will know just what timber should be sold first and how much it can safely dispose of.



Large California Timber Sale

With the purpose of contributing to the development of northwestern California, the Department of Agriculture has offered to sell about 1,000,000,000 feet of timber in the Trinity National Forest in that state. This is said to be the largest output of the national woodlands ever offered for sale at one time.

In order to encourage the building of a railroad, the department decided to sell all

timber which can be safely cut and removed on the north and east sides of Grouse Creek and of Hay Fork of Trinity River, covering an area of 200,000 acres.

The government will not permit a monopoly by one company of all the timber in a given locality or place it in private hands for speculation.



Changes of Boundary

The President has signed a proclamation eliminating 383,809 acres from the Coronado National Forest in Arizona, and adding 15,120 acres. These changes are the result of a careful field examination made last summer by the United States Department of Agriculture in pursuance of a general plan for the correction of all national forest boundaries.



Another Presidential proclamation eliminates 16,012 acres from the Deerlodge National Forest, Montana, and transfers approximately 33,358 acres from the Deerlodge to the Beaverhead National Forest.



A Contribution to Silvics

The dendrological laboratory of the United States Forest Service has completed a study which shows that the conditions of soil and site which affect the height growth of a given species of tree affect also the length of the wood fibers. Foresters are familiar with the fact that the same species of tree grows very differently in height in different situations, and also develops considerable differences of wood. For this reason, they always seek to discover the exact conditions under which a tree will have to grow if the attempt is made to use it in forestry. They distinguish very carefully what is called "the quality of locality," which is the technical name for these conditions in a given case. The discovery made by the Forest Service demonstrates, for the species that was studied, that the quality of locality also determines whether the average length of wood fibers will be greater or less than the average length for all conditions. The better the situation, the longer the wood fibers.

So far as known at present, the subject had not previously been investigated. Its scientific value is obvious. Its practical value lies in the fact that by the microscopic

methods employed in this case it will doubtless prove possible, in time, to determine the silvicultural possibilities of a species, in part at least, in the laboratory.

STATE WORK

Wisconsin Wood-using Industries

A pamphlet on the wood-using industries of Wisconsin has been published by the state board of forestry. The report is the first authentic review of the several industries in the state of which the product of the forests is the principal raw material utilized, and sets forth clearly facts and figures that demand the attention of every manufacturer. It is the second of the cooperative studies to appear, the work having been done by Franklin H. Smith, of the United States Forest Service, under joint direction of the office of wood utilization of the Service, and the state forester of Wisconsin.

The report embraces in detail figures that show the consumption of wood by industries and species, and also the quantities derived from the forests of Wisconsin and from without the state; the uses of the different kinds of wood; the relative prices paid by the industries for the various woods consumed, and other data pertaining to the manufactures.

The wood-using industries of Wisconsin represent a very large part of the wealth of the state that is dependent upon its natural resources. It is to the advantage of all to encourage the fullest development consistent with proper protection of the forests, to the end that the manufacturing interests of the state may continue to have adequate supplies of raw material and prosper accordingly.

This line of work was recently inaugurated by the state of Massachusetts, which has also published a report, in the preparation of which the Forest Service took a part by the cooperation of Mr. Hu Maxwell of the Service. The first essential in using the forest economically is to use economically the wood which the forest produces. Information bearing upon the present methods of using wood is therefore of prime importance, not only to the several states and their citizens, but to the country as a whole. The wood-using industries must be assured that they will continue to obtain their raw materials.

Assistant State Forester in New Jersey

Charles P. Wilbur, of New Brunswick, who has been at work on one of the national forests in Idaho, has been selected by Alfred N. Gaskill, forester to the New Jersey forest park reservation commission, as assistant forester to the commission.

Results on Experimental Forest in Indiana

A recent inspection of the 2,000-acre experimental forest which is maintained by the state of Indiana near Henryville showed that the measures employed to protect and improve the forest are meeting with good success.

Working for New Forest Law in Alabama

John H. Wallace, Jr., commissioner of the department of game and fish in the state of Alabama, is busy preparing to draw up a comprehensive forest law for the state, so that he may have his recommendations in tangible shape to present to the legislature at its next session. He expects to secure the enactment of a progressive measure.

Chestnut Blight in Pennsylvania

The state forest department of Pennsylvania has arranged to send competent men from the state forest academy at Mont Alto to the neighborhood of Bryn Mawr, Haverford, and Ardmore, in order to do what can be done toward the suppression of the chestnut blight, which has attacked and destroyed large numbers of trees throughout Montgomery and Delaware counties.

The Proposed Nebraska State Forest

Active steps are being taken to create a state forest of about 2,000 acres near Omaha and Bellevue, Nebraska, on the Missouri River. The project was broached at the Nebraska conservation congress at Lincoln last spring, and has the support of such influential men as Prof. George E. Condra, president of the Nebraska conservation commission, and Dr. A. A. Tyler, professor of biology at Bellevue College. Now the Forest Service has been requested to send one of its members to examine the tract and report upon its suitability for forest purposes. According to present plans, the examination will be made this month.

A Fire Handbook for California

The California state board of forestry has issued a handbook for the purpose of exhorting the people of the state to prompt action in the suppression of forest fires and proper care in preventing them. It is brief and very much to the point. A summary of the forest laws, rules for the prevention of fires, instructions to fire fighters, and a list of fire-wardens are included. The object has been to appeal to individual initiative. As the state forester says in his notice to the public, on the inside cover: "Nine out of ten forest fires would be forestalled if every Californian were to read this little book and govern his conduct by what it contains." The handbook is distributed free upon application.

EDUCATION

New Head of Maine University Forestry Department

John Manvers Briscoe, of the United States Forest Service, has accepted the position of professor of forestry, in charge of the department of forestry at the University of Maine, Orono, Me., and will take up his new duties at the opening of the fall term.

Mr. Briscoe was born in Pottsville, Pa., July 22, 1878. After attending college, he entered the Yale Forest School, from which he was graduated with the class of 1909. He then took the United States Civil Service examination for the position of forest assistant in the Forest Service, passed it successfully, and was appointed. While in the service he has been specially connected with cooperative work in the Branch of Silviculture and with studies in the section of silvics. He was engaged in reconnaissance work in the Choctawhatchee National Forest, in Florida, and, more recently, accompanied Mr. Raphael Zon, chief of the section of silvics, in a field examination of the possibilities of growing eucalypts in Florida, particularly in the Everglades region.

Forestry at Massachusetts Agricultural College

F. F. Moon, for some time connected with the department of forestry in New York, has accepted the position of professor in charge of the new department of forestry which has just been established at the Massachusetts Agricultural College. Mr. Moon was graduated from Amherst College in 1901, and thereafter spent two years at

the Harvard Medical School. Subsequently, he completed a course in forestry in Yale Forest School, obtaining the degree of Master of Forestry.

It is anticipated that the new department of forestry will develop rapidly. A good proportion of the men now in the college entered with the idea of making forestry a major study.

To Train for Field and Forest

When the country life commission of the state of Washington, appointed recently by Governor Marion E. Hay, meets in Spokane the week of November 14, plans will be presented for a model community center and consolidated country school, to be established in one of the rural districts adjoining Spokane, early in 1911.

David Brown, of Spokane, chairman of the commission, announces that Governor Hay, and possibly Colonel Roosevelt, will attend the conference and assist in formulating a practical plan for the betterment of life on the farm, along the lines suggested in the report of the Roosevelt commission on country life, which, headed by Prof. Liberty Hyde Bailey, of Ithaca, N. Y., made a tour of the larger farming districts of the United States the latter part of 1908 and early in 1909.

This is to be the preliminary step of a nation-wide movement, cooperative with the various states and territories, in an endeavor to teach the youth of the land the fundamental principles of agriculture and domestic economy and manual and industrial training, also giving the farmers in the communities

the benefit of the most approved methods of agriculture and allied subjects. The community center is designed to furnish a place where men and women can meet for the interchange of ideas.

Primarily, the school is for the average boy and girl, whose institutional education ends even before they finish the secondary school, the purpose being to train them to become useful men and women and capable of supporting themselves, and thus adding to the wealth production of the country at large and the districts in which they live, and to better their condition of life.

The Washington commission has prepared tentative plans for a community center, including a consolidated rural school. It is

designed to cover ten acres and will serve a school area of thirty-six square miles, the most distant point being three miles. In addition to the school building, the plans show a large community hall, residence for the principal and supervisor, athletic and play grounds, tennis court, pressure water tanks for domestic, lawn, irrigation, stock and fire uses, and plots for the practice of agriculture, horticulture, floriculture, and forestry. Surrounding and bisecting the tracts will be models of good road building.

The school and other buildings will be under the direction of a principal, trained in the various branches of agriculture and familiar with conditions in the northwest.—*Lumber Review*.

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NEWS AND NOTES

Forestry at the Appalachian Exposition

A building has been allotted to the forestry and mining exhibits at the Appalachian Exposition, which opens September 12 at Knoxville, and lasts till October 12. The forestry exhibit will be in charge of Mr. W. M. Goodman, director-general of the exposition, who keenly realizes the educational opportunity that is thus offered. Lumbermen throughout the state have shown their interest in the exhibit by contributing samples of southern woods.

The United States Forest Service will have an important share in the forestry exhibit. It has furnished transparencies and bromide enlargements showing types of the forests in the Appalachian region and elsewhere, the relation of forests to farm, the effect of fire and careless methods of lumbering upon the forest, methods of lumbering in the Southern Appalachian region, conservative versus wasteful methods of lumbering, different wood-using industries, good and bad methods

of turpentering, work on the national forests, and the effect of forests upon stream-flow and erosion.

Charts loaned by the Service will show the lengthened life given to mine timbers, fence posts, railroad ties, and the like, by preservative treatment. Actual specimens of mine timbers, treated and untreated, which have been in mines for various lengths of time will give tangible illustration of the value of preservatives. Maps will present the various natural resources of the United States and the rest of North America; the navigable waterways; mineral deposits; the various uses to which all classes of lands will probably be put in the future when conservative use of the land has been fully developed; forest regions; the location of the national forests and of United States reclamation projects; the proposed systems of inland waterways, and the present and possible future development of water power in the Appalachian region. A low-relief map of the region will also be exhibited.

The results will be shown of pulp investigations with paper made from the waste of lumbering in the exploitation of various trees whose range extends to the Appalachians; and to these will be added maps of the ranges of the trees concerned and illustrations of the methods used in utilizing waste by this means.

Twenty-one commercially important species of trees will be displayed, cut to show the different sections, and accompanied by range maps of the species. An entire white oak tree, cut in logs of regulation length, will be exhibited side by side with the products that can be made from the various logs when all parts of the tree are utilized to the best advantage. Veneer will be shown from the butt log, lumber from the second, railroad ties from the third, cordwood from the top—cut to four inches in diameter—and from the large branches.

Tannin extract and materials obtained through distillation of oak, namely, charcoal, acetates, oils, and alcohol, will be shown as part of this exhibit. Products of the turpentine industry will be shown, and actual trunks of trees will show the good and bad methods of turpentineing. In addition, there will be detachable-tooth circular saws and band saws, together with logs cut by them, to demonstrate the economy secured by using band saws instead of circular saws.

Kansas State Fair Exhibit

The Forest Service will have a forestry exhibit at the Kansas state fair, held at Hutchinson, Kans., September 10 to 17. This will be devoted primarily to showing the benefits of tree planting. Pictures of plantations of species suitable to that region will be shown, as well as cross-sections of trees specially adapted for planting in Kansas. Prof. George L. Clothier will deliver illustrated lectures on tree planting in Kansas.

Attractive Reminder

The Western Forestry and Conservation Association has gotten out, in their campaign calling attention to the forest fire menace, a most attractive sticker, on which, in white lettering against a red background, is the following statement:

"\$100,000,000 A YEAR IS CIRCULATED IN THE PACIFIC NORTHWEST BY THE LUMBER INDUSTRY. YOU SHARE IT. BURNED TIMBER PAYS NO WAGES. HELP PROTECT THE FORESTS FROM FIRE."

Association for Care of City Trees

The American Association for the Planting and Care of City Trees was recently organized in Brooklyn, N. Y. The purpose of the association is to establish a movement for the planting and care of trees and shrubbery in city streets, and in the yards and about the homes of the citizens, by arousing locality interest and pride and inducing organized local action. The officers chosen temporarily are: President, John J. Schoonhoven, M.A.; vice-presidents, Prof. Henry S. Graves, W. A. Murrill, Ph.D., and Miss Julia E. Rogers (director of the nature club, "Country Life in America"); Secretary, Miss Anna Billings Gallup (curator, Children's Museum); treasurer, Miss Harriet M. Walker; forester, J. J. Levison. The committees and their chairmen are: Membership, Miss M. W. Carmichael; literature, Miss Gallup; schools and neighborhoods, Miss Annie C. Patterson; extension, Mr. Levison; finance, Miss Walker.

Fungus to Destroy Brown-tail Moths

As a result of encouraging experiments made under the direction of Mr. F. W. Rane, state forester of Massachusetts, a fungus called *empusa* is now being planted in various parts of that state in the effort to get control of the brown-tail moth. The caterpillars of the moth eat this fungus, which is fatal to them, and rapidly communicate the disease of which they die to others of their kind.

"Silk" from Wood Pulp

An English firm is said to be putting half a million dollars into a plant in Pennsylvania for the manufacture of silk from pulp wood. For the past two years the manufacture of this silk has been going on in England. The product is called *vicose silk*, and is said to be a very good imitation of the genuine.

Soldiers as Fire Fighters

The Western Pine Manufacturers' Association believes that government troops stationed in states where forest fires may occur ought to be instructed in the art of fighting such fires, and be made available for that purpose. They have addressed a resolution to the President to that effect.

Better Methods for Getting Turpentine

Results of the efforts of the United States Department of Agriculture to introduce in place of the box system of turpentine, which has been so destructive of the pine forests of the south, the much less injurious cup and gutter or cup and apron system, are evidenced in resolutions recently adopted by the executive committee of the Consolidated Naval Stores Company, a representative association of naval stores producers. The resolutions were as follows:

"WHEREAS the experiment made by the United States government, as is shown by the various bulletins from the Bureau of Forestry, as well as the experiments of individuals, and the practical results obtained by the large number of operators, it appears that the use of cups in the gathering of crude gum yields much larger results in quantity of spirits of turpentine produced, and a very great increase of the grades of rosin, as compared with the old system of boxing; and

"WHEREAS it appears that the use of cups is to the interest of producer and factor, tending to increase and perpetuate the life of an industry in which we are engaged, and to the general good and upbuilding of which we pledge our hearty support; therefore, be it

"Resolved, That we, the members of the executive committee of the Consolidated Naval Stores Company pledge ourselves to use every influence at our respective commands toward bringing about as near as possible the universal use of cups as against boxes in the production of naval stores.

"Resolved further, That we now declare it to be the policy of the Consolidated Naval Stores Company to look with disfavor on the boxing of any timber for turpentine purposes in which the Consolidated Naval Stores Company owns any interest."

Lumbermen and Conservation

Lumbermen throughout the country are taking the deepest interest in the second meeting of the National Conservation Congress, to be held in St. Paul September 5-9.

Committed as to its practical conservation, the lumber industry, which will be affected more vitally than any other by the action taken by the congress, should be alert to see that the constructive conservation work of the last two years is strengthened and continued at this meeting, and that no backward step be taken. The deliberations of this congress will have direct results in legislation, both national and state.—*New York Lumber and Trade Journal.*

Large Purchase in Labrador

A New York syndicate headed by C. D. Stanford and R. H. Wing, of Bangor, Me., has acquired from the Anglo-American Development Company the timber land rights in Labrador, consisting of 8,865,920 acres, with an estimated stumpage of 30,000,000,000 feet. The terms of the lease require the company to pay the government of Newfoundland an annual rental of \$4 per square mile for the first year, and \$2 per square mile for each succeeding year for fifty years, with privilege of renewal for forty-nine years. The company plans to cut the timber so as to make the supply perpetual; to establish pulp mills and market the product in the United States and Europe.—*Timberman.*

Mining Company to Plant

The Pocahontas Coal and Coke Company, of West Virginia, has purchased a tract of 5,000 acres in McDowell County for the purpose of reforestation. This land will eventually be planted with trees of various kinds and the result watched with interest, as on this experiment depends in a large measure any future work along this line. The scarcity of mine timbers is beginning to be noticed in this section, and large timber companies are constantly cutting off trees, none of which are replaced. The action of the Pocahontas Coal and Coke Company is one which cannot be too highly commended, as it may mean that this section will in the years to come again be visited by the axes of the woodsman and will not have to depend altogether in the future on other parts of the country for its timber.—*Huntington (W. Va.) Advertiser.*

A Correction

In the July number of *AMERICAN FORESTRY*, on page 396, it was said of the section of timber physics at the Forest Products Laboratory, Madison, Wis.: "This section has in hand at present a microscopic examination of American woods for the purpose of developing a key to their identification based on the structure of the wood. * * *" This statement is erroneous. The work described is in progress, but it is carried on at the Dendrological Laboratory in Washington, D. C., under the supervision of the dendrologist.

AGRICULTURAL LANDS IN NATIONAL FORESTS

An Address by Forester Henry S. Graves to the Denver Real Estate Exchange, August 3

THE object of my present visit to Colorado is two-fold. First, to inspect personally certain forests which I have not in the past had an opportunity to visit, and to meet as many of the people using these forests as possible. Second, to investigate the charges that the administration of the national forests is retarding agricultural settlement in Colorado.

The statement has been repeatedly made that there are in the national forests of Colorado large areas of land suitable for cultivation, and that the Forest Service is withholding these lands from settlement. During the past year the specific charge has been reiterated in Congress, in public meetings, and in the press that there are hundreds of thousands of acres of agricultural land in the national forests of this state withheld from settlement.

These charges have been so persistent and, if true, are of such a serious nature, that I have considered it necessary to investigate personally whether there are facts to justify them. A trip was accordingly planned to enable me to visit certain forests where it is claimed that the largest areas of agricultural lands exist.

The Colorado Stock Growers' Association, at its recent meeting at Grand Junction, appointed a committee to assist me in this matter and advised local associations to appoint similar committees. On July 21 I attended the Gunnison County Stock Growers' Association at Gunnison and met two members of the committee of the state association and the full committee of the local county association. Two men, Mr. T. W. Gray and Mr. William Hartman of Gunnison, were designated to accompany me in the Gunnison forest and show me the conditions, especially certain areas about whose administration by the Forest Service there has been public criticism.

The areas in the Gunnison forest about which there has been public comment are certain open parks in the interior of the forest, notably Union and Taylor parks. It specially was desired that I should see these two parks.

Union Park comprises some 3,000 acres, and is situated at an elevation of over 9,900 feet. There are two classes of land—the

bottom lands skirting the streams, and the intervening rolling sage-brush land. At a guess, I would say that the former occupies about one-fourth of the area. The bottom lands are practically all patented under placer claims, and the nearby water apparently all controlled. I do not know that any one ever expressed a desire to settle on the rolling sage-brush lands under the existing conditions.

Taylor Park, situated at a still higher elevation, comprises probably ten or twelve thousand acres. Like Union Park, there are the two classes of land—those readily irrigable, and the higher, rough, rolling sage-brush areas. I would roughly estimate the former to occupy some twenty per cent. That portion of the park which covers the lands presenting the best possibilities for hay farms has been withdrawn as a reservoir site for the Reclamation Service. It has been claimed that the Forest Service has taken the position that areas at this high elevation would not be listed under the Homestead Act, on the ground that the climate is too rigorous for agriculture.

There have been only two applications for homesteads in Taylor Park. Both have been reported favorably to the forest officers and would have been opened to entry if they had not conflicted with the existing withdrawal for the Reclamation Service project. These applications were, of course, rejected, and I am informed that they are the only applications rejected in the Gunnison forest.

My itinerary took me next through the Sopris forest, over Taylor Pass, and Castle Creek down to Aspen. In this forest, as elsewhere, there are occasional restricted areas of unquestioned agricultural value. Bottoms along the narrow valleys, flats at the confluence of streams, and small benches near water, offer opportunities for farming. The best of these have been appropriated, and the others are being taken up under the Forest Homestead Act, as they are desired by settlers. These areas, in the aggregate, are not large because of the rough topography of the country, but settlers are not being excluded from homesteading on such as exist.

One of the forests about which there has been the greatest criticism is the White River forest. The trip through this forest was

made from New Castle to Yampa. The itinerary took our party first up the west branch of Elk Creek over the flat divide to White River above Meeker, thence up the north fork of the White River, up Snell Creek, down Rough Creek to Pyramid; thence up Bunker Creek on the Spronx trail, by Chaffee's mill, and down the Pinnacle road to Yampa. At Yampa I was met by Senator Ammons, who accompanied the party on a trip into the forest to inspect the kind of land which was being listed for homesteads.

The criticisms with reference to this forest concern three classes of land. First, the high parks. Second, certain areas at lower elevations covered with aspen. Third, lands near the edge of the forest covered with aspen and small oaks.

There are on the high plateaus of this forest a good many open parks, at 9,000 to 10,000 feet elevation. In some cases these open areas are natural parks, comprising swales between the intervening higher ground. Other areas constitute openings interspersed between patches of forest, which by natural reproduction are gradually being restored to tree growth. It is believed by some that many of these high areas can be brought under cultivation, at least, for the production of hay. This possibility the Forest Service does not deny, and we are prepared to encourage such development.

In proof of this, let me state that four applications were made for land on the high country above West Elk Creek. The land was opened to entry. Three of the applicants abandoned their claims very quickly, and the fourth worked a year, plowing some of the land and planting timothy and winter wheat. This last and most persistent of the applicants was a Mr. Lyke, who, with his two sons, operates a sawmill in the forest. I met these men and discussed the matter with them. They felt that possibly a continuance of cultivation for several years would bring the soil into such a condition that timothy could be produced in paying quantities. But they were unable to make the necessary investments to carry on what they considered an experiment with doubtful results. I cite these instances to show that the Forest Service is not standing in the way of the settlement of these areas.

The second class of lands in question includes those areas at lower elevations whose configuration and character of soil permit cultivation. These are in many cases covered with a growth of aspen and are locally called aspen lands. These areas are situated in the bottoms between the ridges, in coves, on benches at the head of gulches, on small mesas, and on the lower slopes of broader valleys. They do not occur in solid bodies, but are scattered. There is really no dispute about these lands.

Senator Ammons accompanied us upon an inspection of certain typical aspen areas near Yampa, where they are said to be as abundant

as anywhere in the forest. We seemed to be in entire agreement as to what ought to be brought under cultivation. Applications have been made from time to time for such areas, and the land has been opened to entry under the Forest Homestead Act. In other words, the Service has been opening them to settlement when they are desired. That there are scattered areas not being settled, is due to the fact that they have not been requested, exactly as there are areas outside the forest well susceptible of cultivation, that have not been taken up.

The third class of land is that near the borders of the forest, which, it is alleged, is not strictly forest land. During the past two years the Forest Service has been examining very closely the boundaries of the forests. Maps have been made showing the character of the land and the vegetative cover, and the local officers have made recommendations regarding eliminations of certain areas not required for forest purposes. In this boundary revision the principles followed by the forest officers are to include those areas which should be used for the production of timber and wood, and those areas on which the cover of trees, brush, or other vegetation should be strictly protected for the regulation of water flow, prevention of wash, slides, or for the other protective purposes. Bodies of agricultural land, pure grazing land, or other classes of land not required for the above-mentioned forest or protective purposes are to be excluded.

Under this policy, established by my predecessor and which I approve, there have already been extensive eliminations, amounting in this state, I believe, to over 500,000 acres. In applying the details of this work, any large bodies of agricultural land are taken out of the forest.

It is not the design, however, to make an extensive elimination of forest land in order to eliminate by presidential proclamation scattered patches of agricultural land which may be located here and there between the ridges. The boundary lines are drawn by legal subdivisions and practical questions of administration are taken into consideration. Sometimes there is a high ridge with good forest growth on the moist slope, but poor growth on the other side. Such a ridge is included for the good forest growth. Many times the poor slope can be restored to good growth or at least the forest upon it very much improved. We are still working on this problem. When the work is fully completed, I do not believe that there will be legitimate cause for criticism of the boundary lines.

As a result of what I myself have seen on this trip and of what I learn from our forest officers of other forests, it is clear to me that there has been a great deal of public misunderstanding of the possible amount of agricultural land in the forests, and of the policy of the Forest Service in administering such agricultural areas as do occur. I find

that the large bodies of agricultural land have been eliminated in the recent boundary work. If other large bodies are found, our officers will present them for elimination. The agricultural lands which remain in the forests are scattered areas occurring as described in the earlier part of this statement.

It is the policy of the Service to open for settlement those agricultural areas which may be found here and there in the forest. It is our emphatic belief that it is of great value to the country to have settlers in the forests, and also that it is of the greatest advantage in protecting and administering the forests. Congress has provided a way for settlers to secure such areas, by the Forest Homestead Act of 1906. The object of this act was to enable settlement without making an elimination from the forest by presidential proclamation.

The criticism is then brought up that, as the law is administered, there are such difficulties and delays in the listing of lands as to discourage settlers, and that in effect the forests retard settlement in spite of the Forest Homestead Act. A number of instances of delay have been brought to my attention. In answer, I can only say that we are doing everything in our power to reduce all delays and to make the time between application and opening of land to entry just as short as possible. Since the establishment of a local district administration a year and a half ago, there has been a great change in the facilitation of this and other business on the forests. Our special effort is and will be to handle this matter with a degree of efficiency which will prevent any hardship on the part of the settler.

Still another criticism which has been brought against the Forest Service is that certain areas of agricultural land are withdrawn for administrative sites, and that these are therefore excluded from homesteading. The proper administration of the forests requires that rangers and guards be stationed at convenient points in the forests. This is important not only in order that they may

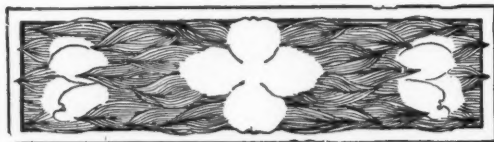
reach the difficult parts of their ranges for fire patrol, but in order that they may be readily accessible for the conduct of local business.

As conditions justify it, the number of rangers will have to be increased. In my judgment, the area now in charge of a single man is too large, and it certainly will not be many years before the size of the ranger district must be reduced. It would be an exceedingly shortsighted and unbusiness-like policy to ignore the future requirements of administering these great forests. I certainly shall not permit myself to be guilty of imagining that conditions are going to remain exactly as they are to-day. Certain areas have been withdrawn for ranger stations and some are not now used. I shall not make any change in any given case until I am perfectly certain that it will not be required for the proper protection and administration of the forest.

In conclusion, let me repeat that I believe that the criticism of the government's policy of agricultural settlements in the national forests has been largely based on a lack of thorough understanding of the conditions and the policy of administration. Settlement should be encouraged on the lands more valuable for agriculture than for other uses, and it is our aim to administer the Forest Homestead Act to accomplish this.

When I get on the ground with different men who have questioned our policy I find that there is little difference of opinion as to what is really cultivable land. I do not find any dispute regarding lands covered with valuable timber. I do not believe that there is much question regarding areas withheld for reservoirs or other public purposes.

I am confident, therefore, that with the co-operation of the users of the forests, which we are already receiving so largely, the matter of agricultural settlement, as other administrative matters in the forests, can be worked out to the best permanent advantage of the local communities of the state and of the nation.



CORRESPONDENCE

The Problem of Public Pasture

A Pioneer's Plea

THE pioneer lays foundations. He is the architect of the building to be. Here in the Sierra National Forest, where I live, the conditions that surrounded the pioneer still appeal to me. I understand in some degree the pioneer's plea for free grass, as of yore. I will state it once for all:

The settler came from Great Britain with the common-law right of feeding off the public pasture, "the commons," that lay near by him. No legislative body has repealed the common law of public pasturing of the waste lands of the United States. After two centuries of unbroken custom, until quite recently, he has come to regard his right to run his stock free on the outlying range as a vested right. In the rugged, broken mountain country, scarcely a claim could be found on which the homesteader could hope to make a living. He needed the grasses on the waste land around, as much as he needed the bubbling branch that threaded its way through his homestead. If he was to subsist on his 160 acres, the herbage of the solitudes adjoining was as much appurtenant as was the water. The government, when patent was issued to him, was fully aware of his environment, that he could not live without the forage of the surrounding fastnesses. And now, since more people must live here, and since the range is more or less exhausted, it seems shameful that conditions must be made harder as they naturally tend to grow worse.

Here in California, the owner of the hacienda let his cattle roam at large on the vast expanse of Mexican public lands. It was his right, and never questioned. Under the treaty of Queretare the right to free use of the public range passed to the people of California, as former Mexican subjects.

A well regulated pasturing of the forest land is a necessity. The herbage must be cropped off as a prudential and protective measure; otherwise the grass, drying, makes a great tinder-box to destroy the growing timber when the flames sweep the curtained hills. Horse and cow do a work the ranger cannot. They are among the greatest public benefactors of the national forest. Why should the owner of stock be fined for what they do, since no other class of property does so much to save the forest?

By reason of alleged concurrent jurisdiction of the federal and local governments, the forest authorities pay one-fourth of the receipts from timber sales and from grazing permits in each county into the county treasury. Thus the settler who has paid the county tax on his stock finds that a part of his permit fee goes into the county treasury, also, and there reduces, however little it may be, the amount of tax necessary to be paid by each of his fellow-citizens. The stock raiser objects to paying permit money either for national or county revenue. He affirms that such a method of raising revenue is unconstitutional; that taxation is cause, and revenue, effect; and that raising revenue without one's consent in any other manner than by taxation is an invasion of the citizen's private rights.

The public land was withdrawn from entry for the purpose of conserving the forest and for the maintenance of a continuous flow of water. The wood and the water are the two primary natural resources of the national forests. The timber, when ripe, is sold. The large lumber companies, outbidding the small mill men, buy the government stumpage, then reserve their own holdings, and thus control the lumber market. They can assess the stumpage upon the consumer, and hence lumber is dearer than ever before. There large lumber interests follow the co-operative methods of "big business," that is, they enjoy a monopoly of the lumber trade consequent upon the corporate ownership of modern machinery. But the stock raiser is old-fashioned. He competes with his fellows. Competition makes it impossible for him to recoup himself and assess permit fees upon the consumer, as the lumber interests can do in the matter of stumpage expenditures. The net price of beef cattle is now twenty-five per cent lower than it was a few years ago. So it does not seem fair to argue that the blade of grass as a secondary natural resource for the conservation of which no appropriation has ever been made, should be held for a consideration in the same way as the giant pine.

The free use of water, however, is claimed by the water trust, that schemes to control the power of the future. Why should poor settlers in pastoral regions, twenty-four out

of twenty-five of whom are not able to cash their store bills, and half of whom are unable to raise their mortgages, be made to raise revenue to maintain the continuous flow of free water for the machinery of monopoly?

The fact that forestry is stunted by niggardly appropriations is greatly to be regretted, but is no argument why the stock raiser should be forced to pay an unconstitutional and unreasonable portion of the public revenue.

AARON W. FREDERICK, A.M.

North Fork, Cal.

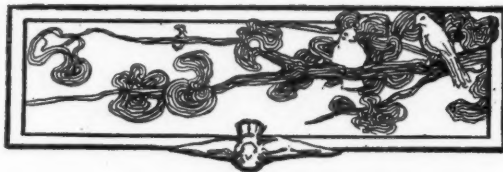
(The main emphasis is laid, in this communication, upon three points. It is urged that the grazing charge is illegal; that it works injury to the forest; and that it subjects the owners of stock to unreasonable and exceptional hardship. But in conceding the dependence of the stock owner upon the public range, and admitting the need of regulation, the writer surrenders his position at the outset, the legality of the charge being accepted as established. It is because the summer range in the national forests is vital to the maintenance of the live stock industry in the west, and because the range, as the writer concedes, "is more or less exhausted," while "conditions naturally tend to grow worse" for the stock men, that regulation in their interest became urgently necessary. All the rest of the present system of range management within the national forests follows as a corollary from this conclusion. Grazing fees are charged not as a source of revenue, but in order to raise a fund for administration purposes, for the progressive improvement of the range, and for the protection of grazing interests. It was not the existence of concurrent jurisdictions which resulted in the payment, under the present law, of twenty-five per cent of the gross proceeds of national forest business to the states in which the business was done, but the need of providing a substitute for county tax incomes when land was withdrawn from settlement to create the forests.

It is felt that the weakness of the correspondent's position is especially shown by his references to the use of timber and of

water-power sites. National-forest timber is not disposed of to applicants who are known to be seeking public stumpage in order to withhold their own timber for speculative advances to be obtained by monopoly when the public timber shall have been cut to the safety limit. But if the national forests had not been created the whole of the western forest would have fallen in time into the hands of the big interests, against which the consumer would not then have had the protection that he now enjoys by virtue of the existence of a competitive supply in the public forests.

With the water powers the situation is similar. It is through no fault of those who would anticipate and prevent the monopoly of water-power sites that such ominous progress has already been made toward monopoly. The water-power companies have fought a conservation charge for the use of power sites in the national forests and so brought about this menacing state of affairs; and their arguments in justification have been based on the very line of reasoning along which the writer of this communication advances against the only sort of regulation that really regulates—namely, an equitable charge for the use of public property for private profit.

Finally, if the small stock owner is to have fair play in competition with the large stock interests, the range can no longer be left to free competition, because conditions have so changed that "free competition" is the best ally of tyranny and numbers against weakness. The theory that might makes right on the range is contrary both to sound economics and to the square deal. As things were going, there would very soon have remained neither freedom of the range nor, indeed, the range itself. And the brightest side of the whole matter is that the stock men who were suffering under the old régime of oppression are finding their lost opportunity under regulation; while the chief protestants against the new range democracy are the illegitimate monarchs of the range, whose title rests upon the conquest not of stubborn nature, but of weaker competitors crowded out in the fight for a foothold.—Ed.)



STATE FOREST OFFICERS

Important changes have taken place during the past year in both the organization and the personnel of the state forest departments, and similar changes are taking place constantly. In order to record the progress made, as well as to invite corrections and make the list complete and accurate, a table of state forest officers, with their titles and addresses, is printed below:

STATE FOREST OFFICERS

State or territory	Name and post-office	Official position
Alabama.....	John H. Wallace, Jr., Montgomery.....	Commissioner, department of game and fish.
California.....	G. M. Homans, Sacramento.....	State forester.
Connecticut.....	S. N. Spring, New Haven.....	State forester.
Hawaii.....	Ralph S. Hosmer, Honolulu.....	Superintendent of forestry.
Indiana.....	Charles C. Deam, Indianapolis.....	Secretary, state board of forestry.
Iowa.....	G. B. MacDonald, Ames.....	Forester, agricultural experiment station.
Kansas.....	Chas. A. Scott, Manhattan.....	State forester.
Kentucky.....	M. C. Rankin, Frankfort.....	Commissioner, department of agriculture, labor and statistics.
Louisiana.....	F. J. Grace, Baton Rouge.....	State forest commissioner.
Maine.....	Edgar E. Ring, Augusta.....	Land agent and forest commissioner.
Maryland.....	F. W. Besley, Baltimore.....	State forester.
Massachusetts.....	F. Wm. Rane, Boston.....	State forester.
Michigan.....	{ Marcus Schaef, Roscommon.....	State forester.
	{ Filibert Roth, Ann Arbor.....	State forest warden.
Minnesota.....	Gen. C. C. Andrews, St. Paul.....	Forestry commissioner.
Montana.....	Charles W. Jungberg, Helena.....	State forester.
New Hampshire.....	E. C. Hirst, Concord.....	State forester.
New Jersey.....	Alfred Gaskill, Trenton.....	Secretary, forest park reservation commis- sion, and forester.
New York.....	{ James S. Whipple, Albany.....	Commissioner, forest, fish and game com- mission.
	{ C. R. Pettis, Albany.....	Superintendent of state forests.
North Carolina.....	J. S. Holmes, Chapel Hill.....	Forester.
Ohio.....	Edmund Secrest, Wooster.....	Forester, state agricultural experiment sta- tion.
Oregon.....	{ J. W. Baker, Cottage Grove.....	Forestry, fish and game warden.
	{ A. B. Wastell, Portland.....	Secretary, state board of forestry.
Pennsylvania.....	Robert S. Conklin, Harrisburg.....	Commissioner of forestry.
Rhode Island.....	Jesse B. Mowry, Chepachet.....	Commissioner of forestry.
Tennessee.....	H. A. Morgan, Knoxville.....	Director, college of agriculture and ex- periment station.
Vermont.....	Austin F. Hawes, Burlington.....	State forester.
Virginia.....	G. W. Koiner, Richmond.....	Commissioner, department of agriculture and immigration.
Washington.....	{ R. W. Condon, Port Gamble.....	Chairman, state board of forest commis- sioners.
	{ J. R. Welty, Olympia.....	State firewarden and forester.
West Virginia.....	A. B. Brooks, Morgantown.....	State forester.
Wisconsin.....	Edward M. Griffith, Madison.....	State forester.

STATE FORESTRY ORGANIZATIONS

A list of state forestry associations and their secretaries is printed below. Corrections in this list will be carefully recorded by AMERICAN FORESTRY.

Name of organization	Secretary	Address
Appalachian Mountain Club.....	R. B. Lawrence.....	Tremont Bldg., Boston.
Arizona—Salt River Valley Water Users' Association.	Charles A. van der Veer.....	Phoenix.
California—Water and Forest Association.....	I. C. Friedlander.....	1405 The Merchants Exchange Bldg., San Francisco.
Forestry Educational Association.....	E. C. Damon.....	San Diego.
Sierra Club.....	William E. Colby.....	San Francisco.
Pacific Coast Forest, Fish and Game Association.	Wm. Greer Harrison.....	San Francisco.
Tri-counties Reforestation Committee.....	Miss L. A. Finch.....	Riverside.
Colorado Forestry Association.....	Ellsworth Bethel.....	Denver.
Connecticut Forestry Association.....	F. H. Stadtmüller.....	Elmwood.
Georgia Forestry Association.....	Alfred Akerman.....	Athens.
Iowa Park and Forestry Association.....	Welsey Greene.....	Des Moines.
Maine Forestry Association.....	Edgar E. Ring.....	Augusta.
Massachusetts Forestry Association.....	Irving T. Guild.....	4 Joy St., Boston.
Michigan Forest Association.....	H. G. Stevens.....	25 Band Chambers, Detroit.
Minnesota State Forest Association.....	E. G. Cheyney.....	St. Anthony Park.
Nebraska Park and Forestry Association.....	Miss Leila B. Craig.....	York.
New England Forest, Fish and Game Association.	Arthur T. Harris.....	16 State St., Boston.
New Hampshire—Society for the Protection of New Hampshire Forests.	Allen Hollis.....	Concord, N. H.
New York—American Forest Preservation Society.	Geo. Milroy Bailey.....	Corfu, N. Y.
Forestry, Water Storage and Manufacturing Association of the State of New York.	Chester W. Lyman.....	1 Broadway, New York.
Northern New York Forestry Association.....	O. B. Trappan, Director.....	Potsdam, N. Y.
State of New York Fish, Game and Forest League.	L. C. Andrews.....	Elmira.
The Association for the Protection of the Adirondacks.	Edward Hagaman Hall.....	Tribune Bldg., New York City.
North Dakota State Sylvan Society.....	Miss Ella J. Mitchell.....	Penn.
Ohio—Cincinnati Forest and Improvement Association.	Adolph Leue.....	127 West Twelfth St., Cincinnati.
Ohio State Forestry Society.....	Prof. J. J. Crumley.....	Wooster.
Oregon Conservation Association.....	A. B. Wastell.....	904 Lewis Bldg., Portland.
Pennsylvania—Franklin Forestry Society.....	W. G. Bowers.....	Chambersburg.
Pennsylvania Forest Association.....	F. L. Bitler.....	1012 Walnut St., Philadelphia.
Vermont Forestry Association.....	Ernest Hitchcock.....	Pittsford.
Washington Conservation Association.....	Clarence H. Bailey.....	P. O. Box 236, Seattle.
West Virginia Forestry Association.....	A. W. Nolan.....	Morgantown.

